



Summary of the 1st FOM Meeting

Held on Tuesday 20th February 2018

Agenda <https://indico.cern.ch/event/697538/>

- 1. Welcome to FOM 2018*
- 2. Status of the machines*
- 3. Linac2 YETS activities report*
- 4. PSB YETS activities report*
- 5. PS YETS activities report*
- 6. Schedule updates*
- 7. AOB*

1. Welcome to FOM 2018

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [FOM representative list](#) was updated with the information received so far.

2. Status of the machines

Linac2 & Linac3

D. Kuchler reported the status of the linacs.

The Linac2 source was restarted and the first beam down the linac is expected in the afternoon.

The Linac3 source will be restarted on Monday next week. There are still some BI equipment missing.

Linac4

JB. Lallement reported the status of the Linac4.

The Linac4 is being restarted. Yesterday, a first beam was accelerated in the RFQ.

CLEAR

A. Curcio reported the status of CLEAR ([Annex 1](#)).



The installation of beam diagnostics and of forthcoming experiments was completed. The DSO test went fine and the beam commissioning is starting today.

3. Linac2 YETS activities report

A. Berjillos reported on the Linac2 shutdown activities ([Annex 2](#)).

Main activities and usual maintenance were completed, especially the installation of two cable trays and AC cables for the LT.BHZ20 magnet power converters that was moved to the Linac2 equipment gallery. The tunnel was closed on January 31st and the beam permit was signed quite in advance (thanks to the new procedure). As already mentioned in the machine status, the 50 MeV beam will be restarted in the afternoon and available to the PSB on the 2nd March.

4. PSB YETS activities report

D. Hay reported on the PS Booster shutdown activities ([Annex 3](#)).

The list of activities that took place in the tunnel and in the surface building was given and most of them were completed. The installation of the auxiliary cables and power supplies for the BSW power converters located in the BR2 as well as the completion of the cabling needed for the POPS-B testing (VIC to take place tomorrow) will take place in parallel with the HW tests.

The status of the 4 ECRs applied during the YETS can be checked thanks to the new [EN-ACE tool](#).

Answering a question from **B. Mikulec**, **D. Hay** added that thanks to the new procedure, the lock-out went very smoothly and took only one day.

5. PS YETS activities report

F. Pedrosa reported on the PS shutdown activities ([Annex 4](#)).

The list of main activities that took place in the PS ring, the switch yard, TT2 and on surface was given. They were mainly consisting in regular maintenance, ATP cleaning, replacement of 15 magnets in the TT2, installation of new GSM cable, of 5 new power converters in Bdg. 355 and of new beam instrumentation. The decabling campaign took place in 4 different buildings and more than 4000 cables, representing 185 km, were removed from January to mid-February with only 10 cables found accidentally damaged so far. Thanks to the efficient shift work, the lock-out was removed 3 days in advance. **F. Pedrosa** concluded with acknowledgements to the different teams involved for their excellent work.

6. Schedule update

B. Mikulec presented the [injector schedule](#) (version 1.1).



The DSO tests for the PSB and the PS took place on schedule yesterday. The LHC4 tests are postponed. The Linac2 beam will be sent to the Switchyard next week and to the PSB on Friday. First physics in the East Area and nToF is scheduled for 23rd of March.

7. AOB.

B. Mikulec presented the Piquet starting dates for the 2018 run ([Annex 5](#)). Information is still missing from the TE-MPE group. All groups are invited to update the Piquet information on the OP webtool page.

The CO group (**G. Kruk**) sent the following information:

Tomorrow (Wednesday) morning at 9:00 we plan to upgrade the LIC Central Timing (PSB, LEIR, CPS, SPS) to SLC6 (64 bits version). The update requires only reboot of the LIC CT FEC and will take approximately 10 min, during which the timing will be down. The reboot of client FECs is not necessary. Note that the update does not contain any changes in logic but there are some adaptations to the 64-bit architecture and we rely on new versions of drivers to program timing hardware modules. The new version has been tested as much as possible in the Timing test bed and it all seems to work properly. If there are any issues with the new version found during the startup of different machines we can always rollback to the current (32-bit) version within 5-7min (the time of the reboot of the CT FEC).

Next Meeting: Tuesday 27th February 2018.

Minutes reported by [JB. Lallement](#) on 22nd February.



Summary of the 2nd FOM Meeting

Held on Tuesday 27th February 2018

Agenda <https://indico.cern.ch/event/708220/>

- 1. Follow up the last FOM*
- 2. Status of the machines*
- 3. SPS - YETS activities report*
- 4. Schedule updates*
- 5. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

2. Status of the machines

Linac2 & Linac3

D. Kuechler reported the status of the linacs.

Linac2

On Tuesday 20th February morning, the beam stopper LI.STP de-condemnation was promised, but only done at the end of the afternoon meaning a whole day was lost.

On Wednesday 21st February morning time was lost due to the central timing upgrade (RF had to be stopped and restarted), and on the same day during the study of a problem, it was realised that the wrong power converter for LT.BHZ20 was condemned. After the condemnation of the correct power converter, a watchdog problem occurred (as the electronics gets no power, no information is published, but the watchdog needs this information). It is the same problem as last year with the old converter, which should have been sorted out.

On Friday 23rd February (after a discussion with **B. Mikulec**) it was decided to wait for the Switchyard beam permit, which would solve problem automatically. At the moment (of the FOM) it is still not signed.

Linac3

The re-commission of the ion source was started.



All tests of sub-systems were successful, meaning the repair of the main insulator done during the YETS was a success.

B. Mikulec said that there are three points to be followed up. First, she will contact the EPC group to get feedback about the LT.BHZ20 issue. Second she will ask EN-STI why the lock-in of the beam stopper took a whole day. Moreover, third, for the next central timing interventions, RF experts have to be warned in advance.

Gourber-Pace M. asked if the problem was that the distribution list for the timing intervention was incomplete.

B. Mikulec answered that it was mentioned in the FOM, but not sent out to a larger community, which should be done the next time, as the impact is now known.

F. Pirotte clarified that the LT.BHZ20 had to be condemned first, so the delay of the beam stopper lock-in was not an issue of EN-STI.

Linac4

S. Schuh reported the status of Linac4 ([Annex 1](#)).

A lot of activities during the YETS: The real beam stopper replaced the Iris, the LLRF system (hardware, firmware, FESA 2 => 3, Inspector panels) was upgraded, the high-power RF system was maintained, new type of RF pickups (CCDTL3) were installed, and the commissioning of the debuncher amplifier started.

The source is in operation since February the 2nd. The DSO test on February 13th was successful, and the beam permit was received. Up to 20 mA were transported through the RFQ on February 19th. The re-establishing of the reference phases was needed due to the work which was done on the LLRF. Phase-scans are proceeding with difficulties (some sparking).

On February 26th, the beam went through the DTLs and the next cavities, and good phases till CCDTL1 were found. The source restarted very stably, and very few HV trips occurred (manual operation, no automatic source restart). During the weekend the source stopped pulsing due to problems with the vacuum and the L4L.VPGR.0126.6 turbopump and gas injection valve voltage system had to be exchanged.

The plans for this week are the re-establishing of a stable RF operation and the continuation of the phase scans (testing ToF application, better precision) up to 160 MeV if possible. Also, work on optimal settings for pulse flatness on 3 MeV beam is planned.

B. Mikulec asked if there was a problem with the autopilot application.

S. Schuh negated and added that there was just not sufficient time yet to implement some changes for the autopilot.

B. Mikulec asked if the schedule has to be adapted.

S. Schuh answered affirmatively that a lot was changed for the RF, which is still in debugging mode.



PSB mid-HW commissioning status

F. Chapuis reported on the PSB hardware test activities.

Until now, there were no real problems found during the Booster hardware tests and the end of the period is scheduled for March 1st end of the day. Details are available in ASM: [ASM hardware commissioning](#).

The remaining scheduled interventions are the installation of the new LIU-Wire scanner and the access to the Switchyard to adjust the compressed air pressure of LBE.MSG10, on February 27th morning. In the afternoon, it is planned to perform a dry run with the new TRIM1+4_Zero and a parallel intervention on the transverse feedback system (PLC interface was not ready) including a dry run. An e-mail has been sent as a last call for the equipment specialists informing them about the end of the HW commissioning period.

PS mid-HW commissioning status

M. Delrieux reported on the PS HW commissioning activities ([Annex 2](#)).

More than half the commissioning is achieved. Excellent progress has been made so far. The Switchyard commissioning is completed and the beam permit signed this morning. Most of the power supplies are already tested. POPS and rotating machine have successfully pulsed. The heating issue with MU31 was fixed on February 26th. Things to be followed up are the cable that was accidentally cut for septum 42 and the MTE kickers 4 and 13. The RF 10 MHz is ready to be remotely tested on Thursday, March 1st and the East area has to be tested. The PS ring magnet audio-visual patrol and the CT equipment are also pending. So far, no showstopper was found.

H. Damerou added that about 40-50% of the low-level equipment had been checked in the central building with only minor damages detected due to the de-cabling and that the 10 MHz cavities have been pulsed with signals from the LLRF.

B. Mikulec asked for the duration of the outstanding magnet polarity measurement in the Switchyard.

M. Delrieux answered that this would not take long.

B. Mikulec proposed to do it as soon as possible in order not to impact the LBE/LBS beam tests and the PSB beam commissioning.

CLEAR report

A. Curcio reported on the activities of CLEAR ([Annex 3](#)).

The intervention of the photocathode laser alignment took place. The beam commissioning started and the first emittance characterization of the year was done. No major issues occurred. The beam commissioning will continue as planned.

D. Kuechler asked about the email which was sent around concerning the grounding of the magnets.

B. Mikulec answered that she tries to get more information.



3. SPS - YETS activities report

D. Mcfarlane reported on the SPS YETS activities([Annex 4](#)).

The beam was turned off at 06:00 on Monday the 18th December. The closure of the SPS was on Friday the 23rd February 2018 at 16:00. Three weeks were foreseen for EPC tests and cold-checkout by OP. The DSO tests on Chain 1 will take place on Monday the 12th March. SPS will receive the beam from the PS on Friday the 16th March 2018, followed by two weeks for beam setup. The SPS will be ready to give beam to the LHC on Monday the 4th April 2018.

There were 7.4 weeks of access, but one day per point was lost due to AUG tests, 1.5 days per point were lost to Access tests and 0.5 days per point were lost due to lift maintenance, which is in total three days. There should be no shortening of the YETS.

Many activities took place in BA1 to BA6. In TT20 due to the bad weather the water came through and civil engineering had to do repetitive repair works.

For the magnet replacement campaign, 13 magnets were replaced or moved. Measurement and alignment of quadrupoles were done. A new GSM cable was installed between BA3 and BA5. An aC coating was done in Arc 5-.

The main LIU Beam Dump activities are finished. A list of the preparation work of LS2 can be found in [Annex 4](#). The crab cavities were installed in BA6. The team fitted a ten-week work into 7.4 weeks.

D. Mcfarlane wants to thank all the teams involved in the successful YETS.

4. Schedule updates

B. Mikulec presented the [injector schedule](#) (version 1.1).

No changes happened since the last meeting. This afternoon there will be beam to the LBE/LBS lines to complete the commissioning of Linac2. The beam will then be sent to the PSB, which is planned for Friday. One week later the beam goes to the PS.

5. AOB

B. Mikulec finally mentioned changes concerning AFT. The AFT was improved during the shutdown. The FOM dashboards for the FOM reports were altered. Now the predefined plot is not a pie chart, but a bar plot, which should give a better overview of the downtime. Only blocking faults are shown. All graphics can be downloaded easily. A suspended state fault can be added to avoid being counted in for the statistics if the downtime happens during the night where there is no piquet coverage, as for Linac4.

Next Meeting: Tuesday 6th March 2018.

Minutes reported by [S. Hirlander](#) on 1st March.



Summary of the 3rd FOM Meeting

Held on Tuesday 6th March 2018

Agenda <https://indico.cern.ch/event/710622/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. PSB HW commissioning report*
- 4. Schedule updates*
- 5. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 2nd FOM](#) were approved.

The TE/EPC group was contacted concerning the LT.BHZ20 control that was not available during the lock-out. They will discuss on having a separated power supply for the controls part of EIS power supplies. It will be followed up during the next FOMs.

An action was opened

2. Status of the machines

Linac2 & Linac3

R. Scrivens reported the status of the linacs ([Annex1](#)).

After the PS switchyard beam conditions were available, LT.RBHZ20 could be switched on. At this point the power converter controls showed a few issues that had not been seen in testing. The EPC experts worked to resolve these, but they could not advance, as the switchyard was used for access. The blocking issue was resolved on Friday afternoon, but there are several points still to be followed up by ABP/OP/EPC. The Linac2 beam was delivered to the PSB on Friday afternoon. There was no other issue and the operation went very smoothly over the week-end.

The Linac3 source is being restarted with a new microwave generator that was installed during the YETS. There are still some missing diagnostics. They will be installed by the end of March.



Linac4

A. Lombardi reported the status of the Linac4 ([Annex2](#)).

The reference cavity phases were lost during the YETS. They are being re-established based on beam loading measurements, which is not a very precise method. Some help is therefore needed from the BI experts to perform Time of Flight measurements. Support from OP is also requested to commission the ToF application.

The plan for this week is to progress with the cavity setting in parallel to 3 MeV front-end optimization studies.

B. Mikulec said that the commissioning of the ToF application could resume on Wednesday and Thursday with the support of a PSB operator.

PSB

B. Mikulec reported the status of the PSB ([Annex 3](#)).

The HW commissioning was successfully completed on Thursday with the beam permit signed. The beam commissioning was delayed due to HW and SW issues with new LT.BHZ20 power converter (new FGC63 class) and could be started on Friday afternoon. An intervention from ABT was needed to fix an issue with the distributor. On Friday night, BI.BTV40 got stuck inside the chamber. It was finally blocked outside beam on Saturday evening after an intervention of a BI expert. Issues with Transverse Feedback were mostly solved on Monday. A couple of issues with BPMs at extraction need follow-up.

Beam preparation is in progress. LHCINDIV is ready on rings 2 to 4 (being set up on R1). The ISOGPS is being set up for orbit correction on 4 rings. The TOF low intensity beam setup has started.

PS

K. Hanke reported the status of the PS ([Annex4](#)).

The HW tests are on-going according to schedule with only few minor issues encountered. There was only very limited collateral damage due to the decabling campaign (KFA45 interlock cable damaged and SMH61 communication cable cut). The new 40 and 80 MHz converter tests are on-going. The status of the new RF remote control is unknown. POPS tests were on-going. Some tests could not be performed yet, as they require the access system to be in beam condition. One of the PFWs trips frequently (maybe related to POPS not pulsing). The wire scanners H54 and 65 could not be used yet (BI following up). A bug in the POPS application was fixed. The CT equipment still needs to be tested, but it is not a priority, as it will not be used anymore after LS2. The polarity of the TT2 quadrupoles that were replaced during the YETS still need to be tested.

The PS restart is on schedule and first beam is expected on Friday starting with LHCINDIV. The orbit measurement will take place at 14 GeV during the weekend (a day is blocked in case a re-alignment is needed).

AD-ELENA

T. Eriksson reported the status of the AD and ELENA.



The AD target area will be closed on the 19/03, the ring on the 22/03 and first beam is expected on the 3/04. Physics is scheduled to start on the 16/04. This morning a vacuum leak was found on a 56HV kicker feedthrough. A new type of seal was installed and vacuum test is on-going. This latest issue could impact the restart schedule.

On the ELENA front, the vacuum issue with the E-cooler was fixed and it is now installed in the ring. Alignment, pump down and bake-out will follow. First pBar injection planned on the 5/04.

ISOLDE

S. Mataguez reported the status of ISOLDE.

There is a problem with the new SEMGrid FESA class and it is therefore impossible to see the beam profile. The beam was nevertheless sent to HRS and ISOLTRAP. They are still on time for delivering the first beam to experiments on the 19/03.

K. Johnston added that the ISOLDE physics schedule is about to be published.

CLEAR

There was no report.

SPS

J. Ridewood reported the status of the SPS ([Annex5](#)).

The machine was closed as planned on the 23/02. The main dipole and quadrupole EPC tests were started following the HV test. The Crab cavity installations are on-going in parallel with accesses for cabling during the night from 26/02 to the 28/02, with accesses every morning from 7h-10h for cryogenics and the afternoon shifts were extended from 20h to 23h to manage accesses and compensate for lost time. The main dipoles and quadrupoles are pulsing together as of the 1st of March. The transfer lines TI2 and TI8 were tested in readiness for DSO tests (DSO tests for chains 2, 3, 4, 5, 6 completed successfully in parallel to LHC DSO tests).

The SPS start-up is on track despite extended access and unforeseen issues.

3. PSB HW commissioning report

F. Chapuis reported on the PSB HW commissioning ([Annex 6](#)).

The machine was closed on the 15/02 and handed over from EN-ACE to BE-OP on the 16/02. The DSO test took place on the 19/02 and the HW tests could be started. All the tests were registered in the machine check-out and the advancement can be checked with the new tool ASM. All the devices were ready for beam commissioning on Friday 02/03 excepted some equipment in the ISOLDE transfer line that should be tested before the ISOLDE restart (water not yet available for tests). As the transverse



feedback was not available in time, the BE-RF tests were cancelled. All the other specific tests and dry runs were successfully completed.

4. Schedule updates

B. Mikulec presented the [injector schedule](#) (version 1.2).

A new version of the schedule ([Annex7](#)) was set up to accommodate for changes of the LHC schedule, to take into account the delay in the AD restart and to implement the updated ISOLDE schedule.

The AD closure was postponed from the 12/03 to the 22/03 with DSO tests following. Beam to ISOLDE was advanced by one week (from the 02/04 to the 26/03). First beam to the AD target was moved to the 03/04 and first beam to the LHC on the 05/04.

First beam to the PS is expected on Friday and the SPS DSO test will take place next week with first beam on Friday 16/03.

5. AOB

IT-DB planned an intervention on the storage infrastructure hosting the controls database files on Tuesday 6th of March, 11am. Duration: 10 minutes approx. The intervention is rolling, so the access to databases (LSA/InCA, CCDB, Elogbook, AFT) will be assured during the whole process, but during the intervention, client applications will perceive a short interruption (1-2 seconds) and then will reconnect automatically.

Next Meeting: Tuesday 13th March 2018.

Minutes reported by [JB. Lallement](#) on 8th March.



Summary of the 4th FOM Meeting

Held on Tuesday 13th March 2018

Agenda <https://indico.cern.ch/event/712689/>

- 1. Follow up the last FOM*
- 2. Status of the machines*
- 3. PS – hardware commissioning report*
- 4. Schedule updates*
- 5. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 3rd FOM](#) were approved.

B. Mikulec mentioned a follow up from the last week. The question was if the EPC strategy for power supplies controls part should be powered separately for elements which are EIS. There are internal discussions and an evaluation is ongoing.

R. Scrivens clarified that for Linac2 this is only used during start up.

B. Mikulec added that it is a general strategy, which also provides the information for accesses. The feedback for this open action is awaited.

2. Status of the machines

[Linac2 & Linac3](#)

R. Scrivens reported the status of the linacs ([Annex 1](#)).

[Linac2](#)

On Tuesday one member of the RF team noticed an overheating connection in a filament heating circuit (the connector was glowing hot). It was decided to immediately stop the beam and start the repair, which took about 4.5 hours. Fortunately, the RF team reacted very quickly. The air conditioning was found to have a defective probe and was repaired on Friday. LT.RBHZ20 controls tests showed that the LBE and LBS applications were not the cause of multiple GETs to FGCs. These applications can be used again.



M. Gourber-Pace asked what the cause of the multiple GETs was.

R. Scrivens answered that it comes from LSA. It is under investigation.

Linac3

The ion source is running for a source test period (RF generator with frequency variation). The hardware commissioning of rest of Linac3 is ongoing. The debugging of FCG controls for pulsed quad and steerers is done.

Linac4

S. Schuh reported the status of Linac4 ([Annex 2](#)).

The RF system is under an in-depth investigation of instability issues with DTL2. At some phases at high cavity voltages, one of the I-Q channels was saturating at 20MV. Two counteracting problems were identified (in the detailed LLRF report). The firmware update is being prepared, and tests are foreseen for Tuesday. The firmware update needs propagation to all cavities, which is time-consuming (~30'/cavity); The reference phases should remain same.

The tools for the RF-phase establishing are ongoing. Testing of new OP ToF application is done. A new application and the FESA class are being tested (delayed by LLRF issue). The automation of reference phase finding is explored (for quicker system re-start) since the current process is manual. It demands a lot of detailed system understanding, and it is time-consuming. Additionally, the automatic guidance is explored to identify the best energy with a phase-scan curve, established by a beam-loading measurement. The possibility to automatize the beam-loading measurement is also studied.

The vacuum leak on CCDTL2 at RF window due to old pick-up design is investigated. It is a known problem, and all 3 RF antennas of CCDTL 2 are exchanged. The beam should come back tomorrow. The reference phases downstream of CCDTL2 need to be re-established.

R. Wegner reported on the details of the LINAC4 LLRF problem ([Annex 2a](#)).

The Layout of the L4 LLRF system is complex. Two counteracting mistakes were implemented in the new firmware of the cavity loop module. First, the signal of the antenna was a factor two too high for the ADC and second the gain in the ADC was a factor two too high, which compensated the first error. The ADC had a certain range and clipped at the nominal voltage of 20 MV. The problem has been fixed and the change will be implemented for all cavities in the new firmware. The update will ~ 30 min per upgrade.

Another problem were cracks in the ceramics of the RF-pickups, which were reused from the old LEP system. Antennas cost about 2000-3000 CHF, and 100 are needed. Now the pulse peak power is a factor 10 higher than in LEP, and it is pulsed every second, differently to the LEP, where the voltage was continuous. This led to cracks in the ceramics. The solution is to use different antennas, developed by J.M. Giguët, where the ceramics are at a location with a low electromagnetic field. They have been tested in the DTLs, and CCDTL3 exchanged in January before the startup. In CCDTL2 due to a leak, the 3 antennas were exchanged yesterday. In the next shutdown, all remaining LEP antennas will be exchanged.

B. Mikulec asked if the LLRF problem could have been detected before having the beam.



R. Wegner answered everything was fine during the set up tested at the nominal. The problem occurred when the voltage scan was slightly above the nominal level. It was not easy to spot since only for some phases the klystron is driven at a higher level.

B. Mikulec suggested to include this case in the scans.

V. Kain asked why the problem with the cracking ceramics of the antennas did not occur earlier.

R. Wegner answered that the decision to reuse the LEP antennas were taken when the Linac4 was constructed. There were no problems with the prototypes found. The antennas were now operated for years, and spectroscopy of the broken antennas showed cracks on the surface, which propagate and connect. It was called the network of cracks.

B. Mikulec asked **S. Schuh** if she could prepare an updated version of the Linac4 beam quality run.

PSB

B. Mikulec reported on the PSB commissioning ([Annex 3](#)).

PSB finished beam commissioning last week.

V. Kain suggested renaming beam commissioning to stand alone commissioning.

B. Mikulec answered affirmatively.

The week was attributed to produce the first beam for the PS. The beam commissioning checklist developed by Emanuelle and his team was used. The open points are issues, which have to be followed up by BI. The part going through ISOLDE is not tested yet. A BTV, as reported last week, got stuck in the injection line a blocked everything for 18 hours. Consequently, the remainder of the grids cannot be tested this year.

The first beam was sent to PS last Thursday 17:30 ahead of schedule. Starting up on Friday should be avoided next time, since due to a problem in LT.BHZ20, there was no time for dry runs, which would have been needed. Starting up should not be planned for Fridays or Mondays.

The main issues during last week were: an intervention on BI1.KSW (fall time), the transverse feedback had to be adjusted, debugged and repaired, due to an overheating of connection filament heating circuit in Linac2 five hours were lost, the R2 distributor had to be repaired (relay change), an issue with R1 synchronization had to be solved on Thursday, the LT.RBHZ20 acquisitions were wrong due to a problem of the watchdog and for the BT4.SMV10 the aux. power supply had to be exchanged.

The beam is already in good shape. For LHC PROBE, LHC INDIV, TOF, MTE_Low_Int, ISOGPS the intensity is up to $\sim 700E10$ ppr. For EAST1/2, AD, LHC25, BCMS25 the steering to PS needs to be done.

Ring one is challenging as last year and is showing a large orbit (± 15 mm) without correction.

The beam stop/access required for Linac2 for the LT.RBHZ20 spare converter, which has to be connected as EIS (2 hours duration), planned for today, 14:00 was shifted to 13:30. In PSB some transfer line pickup signals need to be repaired (1.5h duration), and the amplifier of cavity 51 of PS has to be repaired (unknown duration), and it is planned to access PS at 14:00.

ISOLDE



S. Mataguez reported on the ISOLDE commissioning and the COLD CHECK OUT ([Annex 4](#)).

Now all sectors are under vacuum. The magnet controls MAG70 are working now, but are not fully operational. The new HT power supply and modulator have been installed for the HRS and are working. An intervention took place in the HRS front end area to substitute a patch panel cable, which is used to power the electrostatic equipment. The operational scanner program is not fully debugged yet. The wire grids are not moved by the new plcs, and the new electronics is under commission.

M. Lozano Benito added that new hardware and new electronics were installed this year, which was supposed to be transparent. But at the moment some of the devices work on the FESA level, some work only with the expert applications from BI. There are problems, which still have to be solved. This morning it was possible the first time to take out the beam from PS. Everything is expected to be on time.

B. Mikulec asked if there is now the needed support and a follow up.

M. Lozano Benito answered that there are several layers and it is not completely clear where the problem is coming from.

B. Mikulec asked if the renovations were declared on the official list of control changes.

M. Lozano Benito answered that it was BI hardware/electronics and not controls.

B. Mikulec suggested to use controls change requests and discuss the changes beforehand.

PS

M. Fraser reported on the PS ([Annex 5](#)).

So far it has been a relatively smooth start-up for the PS. HW checkout tests carried on throughout the week with many piquet interventions needed to get equipment up and running. EPC worked on POPS and PFWs most days. The beam permits for the PSR and TT2 were signed, and the first beam received early from the PSB on Thursday evening, allowing an early start for beam commissioning. Amongst many other tests, the closed orbit was measured at 14 GeV/c, and the realignment of MU73 was verified as successful: bringing the beam 3 mm closer to the dummy septum in SS15, and the polarity of the low energy quadrupoles and correctors were also verified with the beam. Over the weekend first versions of LHCINDIV and two MTE variants of 50E10 (core only) and 200E10 (5 turns) were sent to D3. The configuration of the power converter driving the Figure-of-Eight loop appeared corrupted, which made setting up MTE a challenge: the function-driven was not that played nor acquired. Thanks to an EPC intervention on Saturday the problem could be resolved. Further work is required this week to set-up the higher frequency RF systems and resolve various outstanding issues with other equipment. The situation looks good for sending first beams to the SPS by the end of the week. The intervention for the spare LT.RBHZ20 is planned for today at 14:00 and it is foreseen to coordinate the interventions listed in ([Annex 5](#)).

V. Kain asked why the issue of the figure of 8 loop power supply was not detected during the hardware commissioning.

M. Fraser returned that the configuration was changed and the wrong settings were reloaded on Thursday. It was wrong manipulation.

CLEAR

A. Curcio reported on CLEAR ([Annex 6](#)).



No major interventions or issues were reported. The irradiation tests were passed successfully.

Measurements of the minimum bunch length after compression are planned, aiming to go below 1 ps rms according to simulations.

AD

T. Eriksson gave the dates for the AD start-up, without the DSO test dates being confirmed by HSU.

The close of ADT will be done on the 19th March and of ADR on 27th March. The DSO test of AD secondary and ELENA should take place on the 3rd April am and the DSO test of ADR and ADT on 3rd April pm. The beam will be sent to ADT on the 4th April, and AD physics start on the 23rd April - two weeks later than initially planned.

3. PS – HW commissioning status

K. Hanke reported on the PS hardware commissioning ([Annex 7](#)).

The HW commissioning ended according to plans and nothing special is to report. The details on the remaining issues of the last week are listed in ([Annex 7](#)). All in all, the procedure was smooth and successful, where the checklists were particularly helpful. The commissioning started on time.

4. Schedule updates

B. Mikulec presented the [injector schedule](#) (version 1.2).

This week the DSO tests are ongoing for the SPS. There is a beam stop of two hours in the afternoon for PSB and Linac2.

On Friday, the beam will be sent to SPS. The Schedule for the AD should be adapted. Next week the DSO test for ISOLDE takes place, causing a beam stop for PSB, PS, and SPS. The interruption is estimated to take less than one hour. The first beam will be sent to nTOF and East Aera on Friday.

5. AOB

NO AOP was reported.

Next Meeting: Tuesday 20th March 2018.

Minutes reported by [S. Hirlander](#) on 14st March.



Summary of the 5th FOM Meeting

Held on Tuesday 20th March 2018

Agenda <https://indico.cern.ch/event/714980/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Schedule updates*
- 4. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 4th FOM](#) were approved.

The

2. Status of the machines

Linac2 & Linac3

R. Wegner reported the status of the linacs ([Annex1](#)).

It was a pretty good week for Linac2 with only one short trip of the RF amplifier of tank2 and 2 short issues with the new LT.BHZ20 power converter. On Tuesday, a 3 hour stop of the linac was scheduled to allow for the EIS connection of the spare BHZ20 power converter (and the following DSO tests) and a parallel access to the PSB.

Linac4

JB. Lallement reported the status of Linac4 ([Annex2](#)).

Once the LLRF firmware was updated and the RF pick-ups were replaced on the CCDTL2, all the cavity RF settings were found with an automatic beam loading scan. The beam is now going to the main dump at 160 MeV. The RF settings will be refined in the coming days with the ToF. The “beam quality” run will last until mid of May and 4 weeks will be dedicated to achieve the beam specifications detailed in the EDMS document [PSB-OP-EP-0001](#).

B. Mikulec asked when OP should be involved in the beam quality run. **JB. Lallement** answered that as soon as the RF settings will be refined with the ToF, Linac4 will be run 24/7 and OP will be welcome to take part in the operation.



PSB

A. Findlay reported the status of the PSB ([Annex 3](#)).

It was a good week for the PSB, with beam setting-up going well and machine problems being ironed out. There were a few issues with the distributor tripping & TFB power amplifiers frequent trips that was fixed by the specialists. As agreed at the last week FOM there was an access to fix the faulty BPMs in the PSB and the LT.BHZ20 spare and operational were upgraded. Good work was carried out setting up the high intensity MTE with 2500E10 (already available with minimized losses). GPS is now available with 850E10 per ring. HRS and STAGISO have also been set up and are in good shape. LHC25 is within specs and ready for use with the PS. BCMS has also been set up and tested, but final checks are still to be made. Various YASP steering tests between the PSB & PS showed very promising results with a single ring, next step will be to try with all 4 rings.

ISOLDE

S. Mataguez reported the status of the PSB ([Annex 3](#)).

The ISOLDE restart is progressing well, but is slowed down a bit because the facility has to be shared between different teams up to the CA0 line. The DSO tests were done yesterday, on the 19/03. The GPS separator Faraday cup was replaced and the one in the CA0 line was repaired. The HRS HT supply was repaired on Thursday. There are still 4 remaining issues: The high-level application of beam instrumentation and of the magnet controls MAG70 are not fully operational, EPC is taking care of the MAG70 trips and investigations are on-going concerning the HRS line trips.

PS

K. Hanke reported the status of the PS ([Annex4](#)).

The setting-up is well progressing and the beams are now delivered to the SPS. A number of interventions took place on Tuesday afternoon, in the shadow of the PSB access (work on PFW power supplies, C51 amplifier, BLM, screens and wire scanner). The "missing" BLM135 was checked and it was found that the cable was cut. Pulling a new cable will require 5-6 h and the intervention was added to the list for ITS1 (unless a long stop by then). Other problems during the week mainly concerned the RF, which needed numerous resets and also expert interventions. LHCINDIV, LHCPROBE, low intensity MTE 4 turns, small TOF, high intensity MTE until 1550E10 are now available from the PS. The EAST cycle is sent on the internal dump. The AD beam intensity reached 1200E10.

F. Tecker asked whether one could schedule an access on Thursday in parallel to the nToF DSO tests.
F. Pirotte said that it should be discussed.

East Area

B. Rae said there was nothing special to report.



nToF

D. Macina said there was nothing special to report.

AD-ELENA

T. Eriksson reported the status of the AD and ELENA.

The target area was supposed to be closed this morning, but because of an issue with the cooling system the closure was rescheduled for tomorrow. The ring commissioning will start on the 04/04 and ELENA on the 09/04. ELENA will start at its nominal energy of 100 keV.

SPS

K. Cornelis reported the status of the SPS.

The SPS started very smoothly with beam on Friday morning. After some initial problems with timing settings, the beam could be injected and was circulating immediately, showing once again the excellent work done by the hardware commissioning team. The weekend was mainly spent on qualifying the MOPOS system with kick response measurements, in order to have a list of pickups to be attended to on Monday, before the beam-based alignment. Initial aperture measurements showed that only one of the three remaining (tertiary) vertical restrictions were removed and that no new restrictions were introduced during the YETS.

CLEAR

A. Curcio reported the status of CLEAR ([Annex5](#)).

A bunch length compression below 100 fs was achieved last week. This week will be focused on the plasma lens experiment with the characterization of the focusing field and the verification of the emittance preservation.

3. SPS HW commissioning report

J. Ridewood reported on the SPS Hardware commissioning ([Annex 6](#)).

There were 3 weeks scheduled for the HW commissioning between the machine closure on the 23/02 and the first beam on the 16/03. The Crab cavity installation work was carried on after the machine closure, in parallel to the HW tests, and the helium fill is scheduled at the end of the week. The LSS5 beam dump kicker metallic structure, cabling and ECA5/ECX5 door modifications continued in parallel to the EPC tests. The list of the main encountered issues was given. All in all, up to 86 IMPACTs were requested during the HW test period. Up to 10.000 tests were done through the checklists and although some improvements were made, there is still some room for further improvements that could ease the next start-up. The beam start-up is going very smoothly and 4 quadrupoles were



targeted to be realigned in view of improving the closed orbit. The aperture restriction study is on-going.

The mix of test period and tunnel work did not ease the commissioning, and there might be room for improvement for the coordination of activities in TI2 and TI8.

B. Mikulec pointed out that this year's start-up was made particularly complicated because of the Crab cavity installation. She asked whether some discussion was on-going on the coordination of the TI2 and TI8 activities for the future. **D. McFarlane** commented that things were clear on the shutdown coordination point of view, but maybe less during the HW tests. **V. Kain** added that for the next start-up, one has to make sure that the LHC shutdown coordination is aware of the SPS HW test schedule.

4. Schedule updates

B. Mikulec presented the [injector schedule](#) (version 1.2) and its latest modifications ([Annex7](#)).

The AD target area was supposed to be closed today, but according to **T. Eriksson** it will be closed tomorrow. The start of the AD physics is postponed by one week.

D. Chapuis and **F. Pirotte** said that the DSO tests of the EAST secondary area are scheduled on the 27/03 at 11.00. The LEIR DSO tests on the 9/04. With these changes the new version 1.3 was approved.

5. AOB

A. Bland said that the IT intervention on the update in IPV6 is scheduled from 6.00 AM to 8.00 AM on Thursday morning and some 35.000 machines will be affected. It should not affect the technical network. The previous times such an update took place, it was transparent for operation.

F. Pirotte gave details on an incident that took place in LEIR on the 13/03. For the bake-out of a screen, the EIS test mode was not asked for the intervention and the access system went into "mode repli". For such an intervention, the DSO should have approved a "mise hors chaine" request. In that case, the procedure for an intervention on an EIS was not followed, but the access system reacted well.

L. Jensen said that the incident is being followed-up by **C. Gaignant** and **F. Roncarolo**.

Next Meeting: Tuesday 27th March 2018.

Minutes reported by [JB. Lallement](#) on 22nd March.



Summary of the 6th FOM Meeting

Held on Tuesday 27th March 2018

Agenda <https://indico.cern.ch/event/716468/>

1. *Follow up the last FOM*
2. *Status of the machines*
3. *PS – hardware commissioning report*
4. *Schedule updates*
5. *AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 5th FOM](#) were approved.

B. Mikulec mentioned as a follow-up from the last week concerning EPC: powering the controls part of EIS. EPC replied and **B. Mikulec** proposed to discuss the topic on a higher level involving people from machine protection, EPC and OP, which should be organized.

2. Status of the machines

Linac2 & Linac3

G. Bellodi reported the status of the linacs ([Annex 1](#)).

Linac2

100% beam availability was reported; only a five minutes beam stop took place for a planned LT.BHZ20 firmware intervention.

Linac3

LINAC3 is still in setup mode, and the week was devoted to frequency scans of the Sairem microwave generator and 150ms spacing tests with the source.

E. Mahner added that in Linac3 beam instrumentation work is still ongoing in LEPT, MEPT, and ITFS.

The ITL and ITM sectors are vented, and BI has to install two new SEM grids (ITL, ITM) on 26th/27th March.



A new Faraday cup was installed in ITFS; the instrument is partially supported by a piece of wood. ABP requested the removal of that piece.

B. Mikulec suggested before a definite solution at least an alternative temporary support compatible with safety regulations.

E. Mahner added that the refill of the oven was already done. Impact on LEIR due to the beam instrumentation installations is not clear at the moment.

L. Jensen said his team will follow this up.

Linac4

G. Bellodi reported on Linac4.

The preparation of different chopping patterns for LHC-LIU and ISOLDE-like beams was started. Beam stability checks were done along the pulse length and shot to shot. On Wednesday, there was an access for a source intervention on the H2 gas injection valve. The valve had to be exchanged, and a front-end pumping was done after new leak detection. TOF tests on PIMS11-12 with the BI script were performed, and 161.5 MeV final energy was measured. BI ran laser wire tests. Occasional RF modulator faults (PIMS1, DTL1) were reported, and the chopper is under monitoring due to frequent tripping. The source cesiation took place on Friday in parallel to a BI access to fix an air compression system problem on the SEMgrids in the L4T/L4Z lines.

B. Mikulec mentioned that only three rings were shown and asked if the nominal chopping scheme (~66% chopper OFF / 34% chopper ON) was already tried.

G. Bellodi answered that currently ring four is used to chop off the head of the beam and that a modification of the application was needed to produce beam corresponding to four rings. She also said that the nominal chopping frequency was tried yesterday, but no plot is available.

B. Mikulec wondered if the reported issues with the chopper were maybe due to a more frequent usage. **G. Bellodi** replied that this was unknown and should be surveyed.

B. Mikulec then asked whether measurement of the chopping efficiency were done.

G. Bellodi replied that this was not the case, but could be provided.

PSB

J.F. Comblin reported on the PSB ([Annex 2](#)).

It was a good week for the Booster, with minimal downtime: Just a few power converter trips and a power glitch on Tuesday that allowed to spot a problem on the remote reset of the MPS. The recurring issues with the distributor of ring 1 are solved, and the problems transverse feed-back of ring four are now understood. Proper actions will be taken by specialists soon. The transfer line to ISOLDE is commissioned without beam. Some problems were found, but fixed. Two cut cables were discovered concerning the External Conditions of two EIS, which delayed the beam commissioning of the ISOLDE line.



M. Gourber-Pace added that her team is following up the issue with the cut cables and tries to make a temporary fix. A solution is awaited within the next hours.

B. Mikulec said that EN-EL has already been contacted and will get in contact with M. Gourber-Pace to find out why these cables were cut.

M. Gourber-Pace asked if there was a possibility to run a test before beam commissioning.

B. Mikulec replied that this is already being followed up. Normally there is a test mode to run EIS devices before locking them in again.

J.F. Comblin continued reporting.

Lots of progress have been made on the MTE beam, with an intensity increased to $2700E10$ per cycle. All the LHC beams have been correctly sent to the PS, as well as TOF, AD and EAST beams. The BTY line was checked for ISOLDE, and all the problems were fixed. The HRS beam was correctly aligned on the BTM grids to prepare the annual steering of the beam in the BTY line to the targets. The commissioning of YASP for the PSB-PS steering is mainly finished. All the technical issues have been solved, and the kick response scans were performed. Now, one has to gain experience with actual corrections.

ISOLDE

S. Mataguez reported on ISOLDE ([Annex 3](#)).

The hardware tests and the cold checkout were continued. The time of the facility is shared between OP, the RILIS team, and the RFQ team. The valve HRS10.VVH1 is mechanically blocked. On Wednesday, last week, the HRS FrontEnd was operational with only one pump. On Saturday, the RILIS first ever Doppler-free 2-photon resonances inside the ISOLDE hot cavity were observed. On Monday, the Beam Permit was approved, and SEMgrid tests started on the HRS line. The OP beam instrumentation application is not operational. It is not displaying the SEMgrid and the scanners. The vertical and horizontal YHRS.BSG2100 shows no beam. A few wires of YHRS.BSG5800V are broken. The trips of MAG70 are not understood, which happens around three times a day. An investigation is ongoing about HRS line trips, and slits cut most of the beam on GPS.

PS

F. Tecker reported on the PS ([Annex 4](#)).

The PS had a good week. The beam availability was at 98.4-98.9% last week.

PS delivered the scheduled beams to the SPS, and the setup of further beams was continued. LHCProbe, LHCIndiv, LHC 12b, MTE (low intensity, four turns, and nominal with $\sim 1.8e13$), and AD are available. The TOF beams (up to $700e10$) to D3 and EAST beam to PS internal dump have been prepared. Both zones had DSO tests on Thursday and are waiting for the completion of the Beam Permit. The LHC 72b beam is in preparation.



The energy matching needed special attention due to the B-train measurement. The initial low-energy orbit was 11 mm to the outside. A first energy matching revealed 4.4 G difference and the injection field had to be changed from 1013.6 G to 1018 G. New and old B measurement were consistent, but the new had been calibrated to the old one. An Eddy current compensation card had been re-connected during the shutdown on the F side of the reference magnet unit 101. This card supposedly lowers the field by 5.5 G for a 14 G/ms ramp (the present ramp is 21 G/ms – a factor 1.5 faster). The peaking strip for the start of the old B measurement is only on the D side. So, the reconnection of this card changed the old B-train by $5.5 \text{ G} * 1.5 / 2 = 4.1 \text{ G}$. The new measurement is not affected by the card (since 500G marker coils on both sides calibrate the measurement), but it had been calibrated to the old one.

The compensation card was taken out again to reproduce the 2017 situation. The energy matching was redone and is now like in the last year.

AD

T. Eriksson reported on AD.

The target area was finally closed last Thursday. There is an issue related to the magnetic horn.

Concerning the AD ring, the kicker test had been taken longer than foreseen. The ejection septum has to be run at a lower voltage due to a leak, which already happened a few years ago.

B. Mikulec asked if there is a danger of drifts of the extracted positions when running the ejection septum without water cooling.

T. Eriksson said that there was this possibility.

The DSO test will be done on the 3rd of April. The beam will be taken between the 5th or 9th of April. Physics will start on the 23rd of April.

The ion specialist for ELENA of Germany is currently at CERN to install the 100 kV transformer for the source.

SPS

K. Li reported on the SPS ([Annex 5](#)).

The beam commissioning went well overall. Several problems were detected and solved on the way. The kick response and aperture measurements were carried out. Only one of the remaining three vertical bottlenecks was removed during the YETS interventions. The beam-based alignment was completed, shifting four magnets in 3, 4 and 5. Re-measuring showed a clear improvement (LHCPILOT: 5.502, 3.13 --> 2.432, 1.744; SFTPRO: 2.564, 2.045 --> 2.286, 1.942). The extraction was set up for the LHCPILOT cycle. 12 bunches were injected and accelerated on the LHC 25 ns cycle, and the automatic tune correction was set up. Work was done on the main power converters to enable the economy mode and to improve the QD active filters. The intermittent publication issue of BLM data of LSS6 is still under investigation.

B. Mikulec asked if there were any blocking problems.

K. Li answered that there is a problem with the slow extraction. The displayed losses are too high. Investigations are ongoing.



CLEAR

There was no one present to report on CLEAR, but slides can be found in [Annex 6](#).

TI

J. Nielson said there is nothing special to report. He only announced that C. Pruneaux would represent the section in the FOM from next week on.

3. Schedule updates

Standard schedule:

B. Mikulec presented the schedule. The North Area DSO tests were done as scheduled. The DSO tests for the East Area were also finished on Monday. Beam to ISOLDE will be possible hopefully today. The start of the East Area and nTOF physics planned for Friday could be done in the best case one day earlier after signature of the Beam Permit.

J. Wenniger said that the LHC wants to have the first beam already on Friday, and TI2 and TI8 should get beam today. There is only one LHCPROBE needed while the quality is less critical.

B. Mikulec continued that LEIR will be closed as planned. The AD DSO tests are expected next Tuesday.

LHC beam requests:

J. Wenniger presented the LHC beam requests ([Annex 7](#)).

LHCPROBE is requested from tomorrow.

Over the weekend one nominal LHC bunch was demanded.

The start of the multi-bunch beams from the beginning of week 15 (BCMS).

V. Kain mentioned that initially it was planned only to have the LHCPILLOT cycle prepared, but there was a request of LHC of the LHCINDIV on very short notice. Consequently, it cannot be promised to prepare the LHCINDIV in this time.

4. AOB

There was no AOB to report.

Minutes reported by [S. Hirlander](#) on 27th March.



Summary of the 7th FOM Meeting

Held on Tuesday 3rd March 2018

Agenda <https://indico.cern.ch/event/718790/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Schedule updates*
- 4. AOB*

1. Follow-up of the last FOM

V. Kain chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 6th FOM](#) were approved.

2. Status of the machines

Linac2 & Linac3

F. Di Lorenzo reported the status of the linacs ([Annex1](#)).

It was a pretty good week for the Linac2 with 99.5% availability. There were a few vacuum interlocks on the DTL tank1 (on Tuesday, Thursday, Friday and Sunday). These vacuum faults were cleared by the PSB operators with simple resets. It will be followed-up by the Linac2 team.

The Linac3 source ovens were refilled on Tuesday. On Wednesday the BI team installed the missing SEM-grids (in the ITL and in the ITM lines). The RF cavities were restarted on Thursday. During the restart a bad contact was found on a security switch on the door of the high voltage for the final tube amplifier of the Tank2. The RF team also found a damaged direction coupler that was replaced. The RF was kept on during the entire Easter weekend.

Linac4

JB. Lallement reported the status of Linac4.

The "beam quality" run is on-going. From this week, the linac will be kept running 24/7 with surveillance from the PSB operation.



PSB

GP. Di Giovanni reported the status of the PSB ([Annex 2](#)).

The main activity this week for the PSB was the BTY line steering and the ISOLDE SEM-grid tests. The beam permit of ISOLDE was signed on Monday afternoon, after which BTY.BVT101 could be locked in. Unfortunately, due to a false external condition of this EIS the beam could not be sent down the line. After investigations, it was found out that a cable was cut by mistake during the YETS (and also a spare cable of BE.SMH15L1 that was proposed to be used instead as quick fix). Finally, on Tuesday BE-CO found the location of the cut cable and could repair it. As follow-up, EN-EL will investigate the reason for these 2 wrongly cut cables and BE-OP will work on a procedure to enable testing EIS during HW commissioning. On Tuesday evening/night the beam steering was performed up to the HRS SEM-grid target. On Wednesday the ISOLDE team observed that the vertical beam distribution was too wide, in particular for the converter optics. The optics were therefore modified (experimentally), after which the SEM-grid target measurements and adjustments were redone. It is indeed important that an optics model for the BTY line is provided this year (BE-ABP). On Wednesday afternoon the SEM-grid target was exchanged in GPS and during the night the steering and reference measurements were performed for GPS.

The PSB had few issues over the week. TE-ABT temporarily fixed the issue that led to many trips of B11.DIS10, the VERO power supply of BTY.QDE182 had to be replaced and the Piquet intervened on Sunday to fix an issue with BTP.DHZ30. An issue related to the Stray Field Compensation wrong value from LSA is being followed-up. During the week-end, there were also a few issues related to beam instrumentations, especially with BPMs and BCTs acquisitions.

ISOLDE

E. Matli reported the status of ISOLDE.

As already mentioned, last week was dedicated to the beam steering in the BTY line. Stable beam was reached in HRS up to the RFQ.

PS

A. Guerrero reported the status of the PS ([Annex3](#)).

It was a busy week dedicated to beam setting-up: LHC25 72 bunches for SPS scrubbing, EAST and AD beams. The nToF and EAST area beam permits were signed on Thursday and beams were sent as requested. On Friday the probe beam was sent to the LHC as foreseen. On Tuesday morning an access was organized for the 10 MHz cavity C96 amplifier exchange (several other interventions were done in the shadow, repair of relay gap of C81, work on the 40 and 80 MHz cavity power supplies, inspection of BLM135 cable, FEC reboots, SHM16 power supply). The beam stop took 2h40m. On Friday a problem with F16.QFO165 stopped the beams sent to TT2 for 1h45min (intervention from PIPO and the expert). On Saturday a power glitch brought down all cavities in the PS.

East Area

B. Rae mentioned that the East Areas started to take beam on Friday evening.



nToF

D. Macina said that they will request the nominal intensity in the afternoon.

AD-ELENA

T. Eriksson reported the status of the AD and ELENA.

The AD ring was closed on Tuesday. On Thursday a water leak in the power supply building (bdg. 366) was found and fixed. The AD target area, the AD ring and the experimental area DSO tests are scheduled for today.

The new ELENA source isolation transformer was installed and the source was successfully tested for 16 hours at 5 Hz at the nominal energy of 100 keV.

SPS

H. Bartosik reported the status of the SPS ([Annex4](#)).

The SPS beam commissioning is progressing well. The slow extraction has been setup on the SFTPRO cycle with low intensity beam. Abnormally high losses at the ZS extraction septa encountered in the beginning of the week could be traced back to a faulty BLM card. The card has been replaced and ZS alignment scans were performed for minimising losses during extraction.

The LHC pilot and LHCindiv cycles with the long injection plateau have been setup including extraction. First beam was injected into the LHC on Friday morning, ahead of schedule. Over the weekend issues were encountered with the WIC causing frequent trips of the transfer line magnets and LHC injection septum in TI 2. The expert thinks that the source of the problem is linked to the Profibus repeater in Point 2 (LHC access required in order to fix the issue). On Saturday the beam was not available for about an hour due to a low level RF problem (it seems a spurious pulse stop signal from the main power supply was triggering a local LLRF veto). Another curious fault occurred on Sunday when various BI equipment lost subscription to the SIS, which in the end was found to be caused by the post mortem server that crashed because of a full hard discs. It took about 3 hours until the beam was back.

The setting up of the 25 ns LHC beams is on track. Up to 4 batches of the nominal 25 ns beam could be injected on the LHC25ns cycle and up to 3 batches were accelerated to flat top during the weekend for scrubbing. The new diffuser installed in 216 (for testing the shadowing of the ZS during slow extraction) still needs further conditioning.

L. Jensen commented that the issue related to the post mortem server crash already happened in the past. **V. Kain** said that this issue is being followed-up and a discussion will take place tomorrow with the relevant experts.

After the meeting, **A. Antoine** sent the following information on behalf of the WIC team:

At the end of the last run (2017) we went through sporadic PROFIBUS-DP slave disconnection problems on the WIC-TI2. The WIC team was unable to find the reason of this failure because it appeared



intermittently and over a very short period. During the YETS, some measurements were performed on the PROFIBUS-DP to check for potential degradation of some parameters but the analysis didn't allow us to identify the source of the fault. An action has however been done by adding a bus repeater where the bus signal is the most attenuated. Unfortunately, this mitigation action hasn't cure the problem, which appeared for y couple of hours only this weekend (the system is stable from Saturday afternoon).

The WIC team is now studying what actions could be taken to remedy the fault. Richard will give you later more details on the actions that will be taken during TS1/TS2.

North Area

B. Rae said there was nothing special to report.

HiRadMat

B. Rae said that the first experiment is scheduled to be installed during week 18.

AWAKE

E. Gschwendtner said that they were setting-up the electron beam line. A 2 week installation period will start next Monday and an extra week of electron setting-up will follow. They will therefore not request any beam before the end of April.

LHC

J. Wenninger said that everything went fine and the first beams were injected on Friday. They will communicate their beam request for the coming days to the SPS.

CLEAR

There was no report.

TI

J. Nielsen reported on the 2 major events that occurred last week ([Annex5](#)).

On Saturday evening, an electrical perturbation on the 400 kV network was confirmed by EDF/RTE and affected the PSB and the PS. There was a fire alarm in the SPS (TX3) during the night from Sunday to Monday. As nothing was found by the fire brigade and the Piquet, it was agreed to reset the alarm and restart the machine.



3. Schedule updates

V. Kain presented the [injector schedule](#) (version 1.3).

The DSO tests are taking place today in the AD. The beam will be sent to LEIR on Monday 16/04 (DSO tests next week). Wednesday's and Thursday's MDs will start in 2 weeks.

4. AOB

There was no AOB.

Next Meeting: Tuesday 10th April 2018.

Minutes reported by [J.B. Lallement](#) on 5th April.



Summary of the 8th FOM Meeting

Held on Tuesday 10th April 2018

Agenda <https://indico.cern.ch/event/720007/>

- 1. Follow up the last FOM*
- 2. Status of the machines*
- 3. Schedule updates*
- 4. AOB*

1. Follow up the last FOM

V.Kain chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 7th FOM](#) were approved.

2. Status of the machines

Linac2 & Linac3

D. Kuechler reported on the status of the linacs.

Linac2

The machine had an excellent week with 100% uptime. The issue of the vacuum interlocks was solved on Tuesday. The interlock was connected to an ion pump which is near to its end of life and showed some erratic behaviour. The interlock was moved over to another ion pump on the same tank. A similar problem appeared already last year, and as all the pumps have the same age, it is likely to happen again.

Linac3

This was/should have been the first weeks of beam set-up in the Linac3. But the microwave generator Sairem2 failed due to a cooling issue of the klystron. The team is preparing in cooperation with the company a more robust solution. Meanwhile, the beam is produced with the spare generator Sairem1. Besides, the controls of the ramping cavity/de-buncher (soft- and hardware) are not working correctly. The RF team is working on it. The issue could be tracked down to a change during the YETS for measurements for the upcoming digital LLRF system to be installed in LS2. The installed devices have to be removed before testing the RF again. When it was tried to send the beam down the Linac3, a timing misalignment of the new FGC3 power converters in the ITF line was diagnosed. The signal in OASIS is shown too early. EPC is working on it. The beam could not be passed through the machine.



V. Kain asked why the issue was not detected earlier.

D. Kuechler replied that the oasis signals were not available earlier and at this moment the problem was handed over.

M. Gourber-Pace said that her team would follow this up.

Linac4

S. Schuh reported on Linac4 ([Annex 1](#)).

Linac4 is running 24/7 with overnight surveillance from the PSB OP team. Last week (Wed-Friday) was devoted to fine-tuning of the phase and amplitude settings of the RF cavities with energy measurements via ToF technique. The ToF application is now validated for energy measurements (the RF setup procedure still requires a good dose of human discernment and offline data analysis). Today there is an access to repair a CCDTL pickup.

PSB

G.P. Di Giovanni reported on the PSB ([Annex 2](#)).

It was a good week for the PSB with > 99% availability. The main downtime (~45 minutes) was due to one of the recombination kickers, BT4.KFA10, which took a long time to reset and required the intervention of the expert. Otherwise there were a few trips which could always be quickly reset. The setting up of LHC100ns advanced well. This LHC special beam will be needed after the 1st technical stop in June. The R1V WS calibration issue is fixed (open issue from the last FOM). Finally, several studies are ongoing: the preparation of the reliability run of the phase noise longitudinal blow-up, a beam-based investigation of the calibration of the wire scanners, the preparation of an alternative high intensity version of the MTE beam based on ISOLDE beam and tests on the closure of the PSB extraction bump.

V. Kain asked what the actual status of all of the operational beams is.

G.P. Di Giovanni said the commissioning is mostly finished.

ISOLDE

L. Fadakis reported on ISOLDE ([Annex 3](#)).

The proton scan is ongoing and yields measurements. ISOLDE was supposed to take the beam since Monday, but had to be shifted to Wednesday. The first users are CRIS, receiving the beam from HRS. ISOLDE has been taking stable beam since Friday afternoon with no major issue. The set up was performed on 85Rb. Thursday the 5th, ABT performed tests on their new high voltage power supply while taking protons. It is currently connected to HRS. The results are satisfactory. The power supply was tested with different voltages (30 to 60kV) and different proton intensities (1E12ppp to 3E13ppp). For HIE-ISOLDE on Tuesday the 3rd, a fault was discovered on the RF power line for cavity 3 in the last cryomodules. As a consequence, this cavity cannot be powered. It can be bypassed for beam. A list of all issues can be found in ([Annex 3](#)).

PS

H. Damerou reported on the status the PS ([Annex 4](#)).



It was a very good week for the PS with beam availability above 97%. About 1h20 were lost to diagnose the consequences caused by the wrong distribution of the magnetic field from the White Rabbit B-train, aborting the cycle execution at certain slots in the super-cycle. This was fixed by a cold restart of the field measurement front-end. On Saturday morning, most beams could not be delivered during 0h55 due to an issue with the power converter of F16.QFO165. Finally, on Sunday morning POPS required an intervention by the power piquet to restart after a trip causing 1h17 downtime.

The EAST beam is operational including the parasitic ToF. The 25 ns BCMS beams (12 and 48 bunches) have been prepared up to nominal intensity per bunch. Tests of the high-intensity single-bunch beam for AWAKE have started in PSB and PS. The MTE beam has been delivered at 4E12 ppp until Saturday, when the intensity was doubled on the request of the SPS. It has been tested in the PS by the operations team up to 1.8E13 ppp.

East Area

B. Rae said that it was running very smooth.

nToF

Nothing special to report.

AD-ELENA

T. Eriksson reported on the status AD and ELENA.

It was planned to finish the AD hardware tests last week and take the beam from yesterday. There was a minor issue with the control system of the new power supplies for the orbit correctors in the ring. The debugging of this is still ongoing. The next step is to check the polarities. The magnetic horn power supply issue is the most serious one. There was a fire in one of the six units. A cable got loose and produced sparks. Fortunately, the situation was assessed very fast, and the damage is minimal. With one or two weeks of additional delay, the start of physics is at the 30th of April.

For ELENA, also some issues had to be reported. The DSO could not be finalized. The ELENA commissioning run has started. The source is working well with H-. The electron cooler installation was completed in parallel to the ion beam. The vacuum bake out is finished. On the 17th of April, there will be safety inspections.

SPS

F. Velotti reported on the status the SPS ([Annex 5](#)).

It was an intense week for the SPS with 81% availability. Three chief faults were reported. The first issue was the TED TT40 in PLC, which was stuck for some time. Secondly, a septum got blocked during a scan. Finally, the main problem was the BLMTT20, which is still ongoing. The SFTPRO commissioning is continuing, with an Intensity at FT of $\sim 1.2e13$ protons. A new regulation algorithm is used for a better tracking /noise ratio. The physics started Monday at $\sim 19:00$ due to the BLM TT20 issue. Concerning the LHC beams, the standard cycles are already in a good state. Three batches were accelerated and used to scrub the machine. The BCMS was taken with 12 bunches yesterday. And low-intensity cycles were delivered to LHC for commissioning, which was blocked for some time by the issue of TED TT40.



A few BLM channels around the TT20 splitter were discovered to be missing. The BI expert was called. After exchanging the cards, still a three times higher loss was observed compared to last year. The high-intensity SE was then stopped due to unreliable beam loss measurements. The NA physics start was delayed to fix the problem, and the experts were working on it. Finally, more realistic losses could be measured yesterday evening and NA physics started. The intervention was postponed to this morning. Also, checks in TI2, TI8, LSS1 will be done.

V. Kain added that this is the last week of commissioning for the SPS and from next week on SPS is operational according to the plan.

North Area

B.Rae reported on the status of the North Area.

It was the setup week for the North Area. It was the first year with almost the whole week used for the setup, which was very useful for the team. He thanks all involved persons. There was an H2, H4 restart Tuesday evening involving a lot of configuration tests. H6 started smoothly on Thursday, and H8 Microbeam test (primary) was more sensitive to the varying beam quality, but it was managed to have a successful tuning of the microbeam, which was less challenging compared to the last year. M2 started on Sunday only, and the K12 setup on is going. As expected, the NA62 Users received beam on Monday night. Everything went ok.

LHC

J. Wenniger reported on the status of the LHC.

The commissioning is progressing well with good availability. There is a small problem with the ramp, which is faster than usual and tuning has to be done. The B trains will be ready around Friday.

CLEAR

A. Curcio reported on the status of CLEAR ([Annex 6](#)).

It was a good week for CLEAR. There were no major issues. A quad main intervention took place and an emittance measurement after plasma lens was achieved. Lastly, a cross-check of the different diagnostics is planned for this week.

TI

J. Nielson reported on the status of BI ([Annex 7](#)).

On Thursday, a router in 513 crashed and for almost one hour there was no network on GPN due to that. On Saturday, the BA6 water pressure was too low, and the interlock on the SEPTAs needed adjusting several times in order not to trip. On Monday, due to an electrical disturbance, several issues were reported.

3. Schedule updates

V. Kain presented the injector schedule ([version 1.3](#)) and mentioned that this week is the last week without MD.

R. Alemany said that the LEIR DSO was finished successfully and LEIR has already beam permit.



4. AOB

There was no AOB to report.

Minutes reported by [S. Hirlander](#) on 10th April.



Summary of the 9th FOM Meeting

Held on Tuesday 17th April 2018

Agenda <https://indico.cern.ch/event/722299/>

- 1. Follow up the last FOM*
- 2. Status of the machines*
- 3. Linac3 HW commissioning*
- 4. LEIR HW commissioning*
- 5. Schedule updates*
- 6. AOB*

1. Follow up the last FOM

V.Kain chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 8th FOM](#) were approved.

The follow-up on the issue with the full SPS post mortem discs can be found under:

<https://wikis.cern.ch/display/MPESC/2018-04-04+-+Debriefing+of+SPS+PM+event+of+last+Sunday>

2. Status of the machines

[Linac2 & Linac3](#)

R. Scivens reported on the status of the linacs.

[Linac2](#)

Linac2 had a smooth operation with no significant incidents.

[Linac3](#)

It was the last week of commissioning. Several issues were reported. The new pulsed converters were found to be misaligned to the beam time. The OASIS signals had just been made available, but also these did not provide consistent timing information, and they also had to be debugged. There was no beam to high energy, which was found to be due to RF modifications (additional LLRF diagnostics) that had changed the phase references. Re-optimization took a few days, but it is completed now with the new LLRF diagnostics. The spare microwave generator is being used, and its remote reset is not working – investigation continues on that. The stripper foil setting up and debuncher setting up needs to be completed.



R. Alemany asked if the new LLRF was installed during the YETS in parallel to the old one up to the RC-DB cavities for tests.

S. Ramberger answered that there were new LLRF cards are now connected for the measurements on all systems except the ramping cavity and debuncher, the new LLRF is only measuring and not acting on the RF. For the RC-DB signals, adding the parasitic measurement transparently is more complicated, and needs a further evaluation from the RF team

R. Alemany asked if the RC-DB cards will be installed during the technical stops this year.

S. Ramberger replied affirmatively.

D. Kuechler added that the new Faraday cup was a great asset to find the beam settings.

Linac4

S. Schuh reported on Linac4 ([Annex 2](#)).

A few issues were reported. The source intensity was drifting from ~20 mA (end of March) to 12-13 mA last week, due to some irregular behavior of the gas injection valve. Investigations are ongoing. At the moment, the source seems to be stable. There was a two-day access to exchange three RF pickups at CCDTL7, to repair a leaking window and to install temperature monitoring on the source injection valve. Afterward, the phases of cavities downstream of CCDTL7 had to be revalidated with beam-loading and ToF. BI performed some testing of BPM signals at very low current and started HW tests on the BSM monitor. The 24/7 operation with overnight OP surveillance restarted Friday night, and the AFT logging resumed Monday, 16th of April. The operation is running with the nominal PSB chopping pattern overnight (the trajectory is not adjusted). A few RF/PC trips were observed over the weekend. The DTL1 modulator anode module had to be exchanged on Monday, 16th of April and the design is now under review.

PSB

V. Forte reported on the PSB ([Annex 3](#)).

It was a decent week for the PSB with 97% availability. LHC50 and 100 ns, LHCINDIV VdM beams were re-established. ISOLDE took the beam during the week. Many tests with the beam took place. In particular, the new B-train performance was investigated and is now ready to be tested continuously during the week for reliability on ISOLDE. The operational wire scanner calibrations were checked through several measurements. The beam for 160 MeV studies was resuscitated. Tests on the prototype wire scanner took place at the beginning of the week without and with beam. Unfortunately, tests with beam were not successful, as BI experts finally suspected a 'broken wire' and will check with a quick (~30 mins) access on Wednesday the 18th of April during the dedicated optics tests for the BT-BTP line. The major issues during the week were failures of the main power supply. The Bdl failures were probably caused by external conditions on BR.QDE2. To understand more details, a quick access is planned today, the 17th of April. At injection, there were trips on BI.BVT and BI.DIS (solved by ABT piquet). An RF R1 phase shift, which caused beam losses on ISOLDE R1, is under investigations.

ISOLDE

E. Siesling reported on ISOLDE ([Annex 4](#)).

It has been a busy week at ISOLDE but with very few faults. Last week the GPS was used for mainly vacuum and functional tests of (used) targets. What seemed to be a short cut on the anode of one of



the targets occurred to be a broken power-supply (GPS Anode1). The GPS is getting ready for the run of this week. On HRS, there were only a few faults. The usual trips of the high voltage power supplies were observed. The main issue was a settings issue. A tapestation intervention on Monday, the 9th of April, to get the tape back onto its reel was followed by a proton scan on Tuesday, the 10th, when strange behaviour occurred with the radioactive beam with regard to the counts at the tapestation. Either complete saturation of the tapestation detector or no counts at all could be measured. What was expected to be a tapestation or beamgate timing issue turned finally out to be an issue in the ISCOOL RFQ. This then prevented short pulses created with the beamgate for measurements with the tapestation to come through. The problem lasted two days before it was figured out what was wrong. In the meantime, setting-up with stable 115In for the CRIS experiment continued, as well as the RILIS setting-up for Indium laser ionisation. After discovering the settings issue, operation was very smooth with good results. A lot of data could be collected over the weekend for ISOLDe.

ISOLDE Users

K. Johnston reported a very good week for the users at ISOLDE ([Annex 4](#)).

From the users' perspective, it was a very good week for the first physics run in 2018. CRIS (laser spectroscopy) took neutron deficient in beams and measured hyperfine parameters and charge radii of 12 In isotopes which had not been measured before. Once, the running the conditions were smooth, many new measurements were possible. The preliminary data are very interesting especially around 101In, which is contradicting theoretical predictions. It may take some time to understand the data, but this was a very good run.

PS

D. Cotte reported on the status the PS ([Annex 5](#)).

It was an average week for PS with 83% availability.

A magnet fault was reported and an investigation on ZT10.QDE01 was carried out. An access was needed to do a thermal scan of the magnet. A hot point (+20 degree) was detected. The beam was down for 12h40 for the EAST HALL (EAST1 & EAST2). A water cooling circuit filter was changed and a limitation on I_{max} has been set. There was a restart with the quadrupole in F16 line (F16.QF0165) on the spare power converter causing a 1h45 beam stop for all beams other than EAST. Finally, there was a CR5 exchange of power distribution module in the central building, resulting in a 1h45 stop for all LHC beams. The summary of the status of the beams can be found in [Annex 5](#).

V. Kain said that the beam quality in previous years with only one 40 MHz was better than now in the same configuration. What is the origin?

D. Cotte replied that the settings were taken from the last year from only one cavity and they had not been adjusted.

East Area

B. Rae said that there is nothing special to report.

nToF



D. Macina reported a very good week. There is a problem with the radiation monitor close to the target. The intensity is a little bit higher than last year, but for the experiments, it can never be enough.

D. Cotte said that one possible reason for the discrepancy with the radiation monitor is that the beam is shifted to the right, as the last BTV shows, whereas the radiation monitor is on the left. It has to be checked if the beam should be moved a little bit back to the centre.

AD-ELENA

T. Eriksson reported on the status AD and ELENA.

AD

An exciting and busy week has been reported. The power supply of the magnetic horn has been repaired, which went faster than expected. There was also bad news concerning the 13 new FGCs, which are not working. Still after two weeks of debugging they are still not operational. EPC is working remotely on it. It is a timing problem with internal stops of the pilot beam.

The beam permits for the experimental areas are being signed bit per bit.

ELENA

Installation work of E-cooler-power supplies has been finished, and in theory, the electrical safety test should be okay.

The DSO to allow GBAR tests in ELENA will be done on Wednesday the 18th of April. Many systems are ready for beam operations.

SPS

K. Cornelis reported on the status the SPS ([Annex 6](#)).

It was an average week with more than 85% of availability.

NA physics started last Monday, the 9th of April at 19:00, about 10 hours late due to problems with the BLM's. On Tuesday, the 10th, the CPU was changed to an old one, and the behaviour of the splitter BLM's turned back to normal. After more investigation of the BI experts, they concluded that the primary source of the problems was due to an OS change during the YETS. By the end of the week, all systems were rolled back. Still a few issues remain. On Tuesday, the 10th, FT physics was stopped from 9:00 to 11:00 for interventions in the North Area. After that, the beam could not be restarted due to an RF problem. It turned out that a card was damaged because of a wrong setting in the coast cycle in combination with a missing reset of the setting on the fixed target cycle. The beam was only back at 14:30. LHC was taking pilots and INDIV beams during the week. A 12 bunch BCMS was prepared and extracted to TED. The SPS was scrubbed for some time with four batches of the 25nsec accelerated beam. Longitudinal parameters were not perfect because of a missing cavity in the PS. The AWAKE cycle will be prepared today, the 17th of April.

North Area

B.Rae reported on the status of the North Area. Physics started last week. No issues.

North Area Users

H. Wilkens reported on the status of the North Area users. The cycles at night are shorter, which is very efficient. More spills can be collected compared to last year.



AWAKE

There was no report on AWAKE.

LHC

S. Redaelli reported on the status of the LHC.

The progress is relatively good. Today, the 17th of April, the first stable beam will be prepared with individual bunches. The phase of the intensity ramp up will start. 48 bunch trains will be required. The scrubbing of LHC will take place next week. The 25ns standard beam is therefore also requested.

CLEAR

A. Curcio reported on the status of CLEAR ([Annex 7](#)).

A good week was reported for CLEAR. The achievements were the cross-calibration of the longitudinal diagnostics and the bunch compression below 1 ps. No major issues occurred. The photocathode laser optimization is planned. Additionally, a quad scan with the plasma lens and a measurement of the bunch length with the shot noise OTR is foreseen.

TI

R. Ledru reported on the status of BI. Details can be found in ([Annex 8](#)).

3. Linac3 HW commissioning

E. Mahner reported on the Linac3 hardware commissioning ([Annex 9](#)).

The summary is as follows:

In week 9, 10 and 11 the GTS-LHC ion source HW tests and start-up period were carried out. In week 12 the microwave generator (Sairem 2) was started up, and HW tests were performed. Also, frequency studies were done by **D. Kuechler**. In week 13, before Easter, the ITM + ITL vacuum sectors were vented (for 3 days), and the SEM grids were dismantled and re-installed. Then RF conditioning was started. In week 14, after Easter, the new microwave generator Sairem 2 was debugged. The beam was produced with the Sairem 1. No beam through linac was achieved. Week 15 and 16 were mainly used to set up the RF to transport beam through the linac. Since yesterday, 16th of April, the stripper foil set-up is finished, and the source converter fault is fixed. Up to 33 μA (+/- 10%) Pb54+ are achieved at the exit of Linac3. Today, the 17th of April, the LBS measurements take place, and the debuncher cavity will be set up. Afterwards, the first beam will be sent to LEIR.

V. Kain asked if the checklists were used.

E. Mahner said that they were used and only a few items have not been done yet.

V. Kain asked what could possibly be improved for the next start-up.

E. Mahner said that the RF problems, which could be not foreseen, could have been prepared better. It was not appropriately communicated that there were modifications. The SEM grid exchange could have been done better since it was announced early enough.

R. Scrivens added that reference measurements for the RF should be done this year.



4. LEIR HW commissioning

R. Alemany reported on the Linac3 hardware commissioning ([Annex 10](#)).

The YETS works were finished successfully. All LIU-Ions installations are completed and will be tested this year. EI and sector one bake out are completed, and the equipment was re-installed roughly on schedule. All maintenance activities are complete. Two weeks were dedicated to the hardware commissioning. Two dry runs were carried out in March, and a heat run of the circuit in ETL was started as well. The DSO test with the beam permit was done on the 9th of April. In ITF, ITH and ITE 24 new FGC3 power converters were installed. OASIS is not fully operational with the new FGCs yet. Seven new BPM were installed in the transfer line, which will have to be commissioned with beam. Finally, a dump system for LEIR was installed. One week is now assigned to set up the EARLY beam and another two weeks to set up the NOMINAL beam. At the end of May, the beam will be sent to the PS.

5. Schedule updates

V. Kain presented the injector schedule ([version 1.3](#)) and mentioned that there is a change to the presented version due to the problem of the magnetic horn in AD, which shifted the start of the physics of AD to the 30th of April. The first dedicated MDs are planned for the current week.

H. Bartosik said that for the North Area there will be no beam for the whole Wednesday, the 18th of April, MD-block. In the afternoon, there will be a test of a non-PPM PSB to PS transfer line optics, which stops all the physics users from 13:00 - 18:00. On Thursday, 19th of April, there will be a reduced duty cycle for the North Area.

6. AOB

There was no AOB to report.

Minutes reported by [S. Hirlander](#) on 17th April.



Summary of the 10th FOM Meeting

Held on Tuesday 24th April 2018

Agenda <https://indico.cern.ch/event/724109/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Schedule update*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 9th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

JB. Lallement reported the status of the linacs on behalf of **G. Bellodi** ([Annex 1](#)).

The Linac2 had an excellent week with no fault and 100% availability.

The Linac3 start-up was completed last week and the beam was officially handed over to LEIR on Tuesday. The source still needs conditioning and was rather unstable, requiring frequent retuning. The second lead oven was switched on and the next refill is still scheduled on Thursday.

Linac4

S. Schuh reported on the Linac4 status ([Annex 2](#)).

Overall, it has been a good week of 24/7 operation with overnight OP surveillance, with only a few faults and running with nominal PSB chopping pattern overnight: 625 ns beam ON, 375 ns beam OFF. Linac4 is running in PPM mode (mixed MD1 and MD5 super-cycle, with two different chopping patterns and common beam destination = L4DUMP). Spikes in the beam current were noticed downstream from the RFQ, no correlation with chopping pattern, seem to be linked to a spurious SIS interlock acting on the pre-chopper to cut the beam at 100us, which is being followed up. BEAM mode was lost due to a ventilation-interlock triggering the external conditions - the door to room 400/1-403 was left open and the monitored pressure compares this room with the tunnel; to be followed up. BI



did some laser wire testing as well as testing of wire scanners. Stripping foil tests were carried out during most nights. AFT logging was started Monday 16/4/2018.

PSB

S. Albright reported on the PSB status ([Annex 3](#)).

It was a difficult start to the week due to the BR1.QDE2 temperature 'over temperature' warnings that started during the previous week. Due to the trips over the weekend and on Monday it was agreed with experts to keep some ZEROs in the super cycle to prevent magnet overheating until there was an access. An initial access was scheduled for Tuesday to check the water flow in the cooling circuits and inspect the magnet with a thermal camera. The first access showed that the magnet was not overheating and the coolant circuit was working correctly, so a second access was needed to inspect the thermal cutout. Due to the regularity of the trips the second access was scheduled for Wednesday afternoon to coincide with a beam stop required for a dedicated MD. However, on Wednesday morning the MD was reorganised for that morning (from the afternoon) to coincide with an LHC access. The access was not rescheduled, as it required the First Line to be available to lock out the machine. An access for a wire scanner check was agreed at the same time to allow additional information to be acquired by the wire scanner team, which confirmed that the wire was broken. The inspection of the thermal cutout on BR1.QDE2 showed that there was a poor connection; it was therefore replaced and has not triggered the interlock since.

Two additional trips of the MPS on Friday required Piquet intervention, and after the second trip the spare MPS was put in operation until the cause can be diagnosed.

There were also a small number of other problems, but these had minimal impact. The White Rabbit B-Train was put into operation for the ISOLDE beams on Thursday afternoon to start the reliability run; if this goes well it will be rolled out to other operational beams as well.

LEIR

R. Alemany presented the status of the LEIR ([Annex 4](#)).

The re-commissioning with beam started on Tuesday and the beam quickly reached the transfer line to the PS on Friday, showing that all the interventions in that area did not cause any damage to the line. Unfortunately, the extraction BPMs were not available making impossible the beam steering. However, a PS synchronization issue could be identified and solved. As already mentioned, the Linac3 source was rather unstable and affected the LEIR optimization. Nevertheless, the LEIR restart is one week ahead of schedule and the commissioning of the NOMINAL beam started already. Until now, no blocking issue was identified.

ISOLDE

M. Lozano reported the status of ISOLDE ([Annex 5](#)).

It has been a very good week at Isolde. IS633 has been smoothly running and taking 8B from GPS according to schedule. No major issues to report. Only some interruptions due to PSB availability. The HRS target was changed and beam will start in a couple of day.



ISOLDE Users

K. Johnston could not be present at the meeting and sent the following information.

It was a pretty good week at ISOLDE. Experiment IS633 were taking 8B (in the molecular form: BF₂) to the LA1 beamline. There they were studying 8B as it decays into highly excited states of 8Be. The principal aim being to observe the electron-capture-delayed proton emission. This is a challenging experiment (the proton emission branch is of the order of 1e-8) so it is too early yet to say if this has been seen. However, the conditions for the run were excellent: stable running with high intensity 8B beam. The users couldn't have asked for a better run.

For this week we will take STAGISO (1 pulse, perhaps two) on GPS with 8e12 ppp with 16us spacing and NORMHRS (as much as possible). GPS and HRS will be running like this from Thursday onwards with perhaps GPS taking protons on Wednesday evening if things are ready by then.

PS

F. Tecker reported the status of the PS ([Annex 6](#)).

The PS had an eventful week, with beam availability around 89%. All standard beams were delivered.

On Tuesday, the beam was taken by the AD for the first time. On Friday, the lead ion beam was sent towards the PS. A dedicated MD, foreseen for Wednesday afternoon, had to be rescheduled on the fly on LHC request for the morning. Several quadrupoles in the PSB to PS transfer line were re-cabled to study a matched optics. The beam was steered through the line and some measurements taken. A timing repeater failure on CFV-365-CPOW delayed the restart after the MD by ~3 hours. This was very difficult to diagnose, as there were several seemingly unrelated problems: beam loss, first suspected to be consequence of the MD, internal dump found blocking, transition problems, and extraction elements not pulsing.

While most of downtimes originated from the PSB, other faults on F61S.BHZ01, F61.BHZ01, and F61.QF003 affected the beams, in particular for the EAST Area. Another access took place to verify the heating problem on ZT10.QDE01, but the present conclusion is to run with a limited current, resulting in a reduction of the momentum for T10 from 6 to 5 GeV/c, which has been accepted by the users for this year's run.

It might be that the 16L2 issue comes back and that the LHC will therefore request the BCS 8b4e beam. The list of operational beams and their details was given.

Concerning the confusion that occurred on Wednesday with the last-minute MD rescheduling, **R. Steerenberg** said that it was decided to have a meeting every Monday morning with all the machine supervisors in order to synchronize and re-schedule consequently the different activities of the week.

East Area

B. Rae said there was nothing special to report.

East Area Users



H. Wilkens said everything went fine and that users were happy. The momentum reduction from 6 to 5 GeV/c should not affect the users too much. Only those using calorimeters might be affected – to be confirmed.

nToF Users

M. Barabagallo said the week went well. The experiment will be changed on Friday.

AD - ELENA

S. Pasinelli reported the status of the AD and ELENA ([Annex 7](#)).

Concerning the AD, the behaviour of FGC3 (function list) seems to be correct and power supplies are following the references. There was an issue with the synchronization between AD and PS due to an interlock from experiments (a 50 Ω termination found to be removed). The machine setting-up was perturbed by several other issues that were detailed. The ejected Pbar intensity reached $2e7$ ($3e7$ nominal in the previous years). There might be a water leak on the target (being followed-up).

The ELENA start-up is progressing well. An H⁻ beam was kept running for 1.5 s (length of the flat top). The Pbars are knocking at the ELENA door and were seen on the first LNI screen.

SPS

H. Bartosik reported the status of the SPS ([Annex 8](#)).

The SPS had a beam availability of 84%. Most of the downtime was caused by the pre-injectors. In addition, a 400 kV transformer tripped because of a weasel and subsequently one of the extraction sextupoles could not be restarted resulting in a total of about 6 hours downtime for the North Area.

The work on the fixed target cycle focused on the investigations of slow extraction losses. It was observed that the losses at the extraction septa showed an increasing trend with time and some correlation with the duty cycle for the North Area. Several checks were performed in collaboration with ABT experts, but the results obtained so far are not conclusive.

Both the 25 ns standard beam with 4x72 bunches ($1.15e11$ p/b within 2.5 μm) as well as the BCMS beam with 3x48 bunches ($1.25 e11$ p/b within 1.7 μm) are ready in the SPS. In preparation for the start of the AWAKE physics run next week, the AWAKE cycle has been set up and successfully tested including the bunch rotation and extraction to the TT40 TED. Only the rephasing to the AWAKE clock remains to be tested.

On Wednesday the first dedicated injector MD block was scheduled. The LHC arranged for access in the morning and so the dedicated PSB-to-PS transfer line MD as well as the SPS access for the crab cavities originally planned for the afternoon had to be re-scheduled for the morning in order to minimize the impact on the LHC beam availability. Unfortunately, due to a timing problem in the PS there was no beam available in the afternoon and so the dedicated slow extraction MD in the SPS could not be performed and the LHC could only be filled at about 7 pm.

The hotspot at FBCT 519 was confirmed on Wednesday during the access (further checks needed).



North Area

B. Rae said it was a good week except a patrol that was lost.

North Area Users

H. Wilkens said that COMPASS will request an intensity increase during the week.

K. Li added that investigations on the hot spot will take place on Thursday night and could affect the North Area. Also the intensity increase will have to be discussed, as the slow extraction losses should first be understood.

AWAKE

E. Gschwendtner said that the last week was devoted to installation. They will take the proton beam from Friday and for the next week. Another installation period is scheduled for week 19.

LHC

E. Bravin reported on the LHC status.

They are presently ramping up the intensity and reached 600 bunches. The issue with the 16L2 might still be present and in that case they will certainly request the 8b4e beam. More news will come during the intensity ramp-up. Only standard beams will be requested this week.

CLEAR

A. Curcio reported the status of CLEAR ([Annex 9](#)).

There was no major issue. Tests to study Cherenkov radiation and wakefields in the CLIC module took place. Plans for this week are measurements of bunch length with shot noise OTR and THz spectrometry and irradiation of electronic components.

TI

J. Nielsen said that the Linac4 event with the ventilation interlock is being followed-up.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.4).

According to the good news from LEIR, the date of the first lead beam to the PS was advanced.

H. Bartosik said that this week MDs are dedicated in the SPS and there will be no beam to the North Area. The PS complex experiments will not be affected.



4. AOB

There was no AOB.

Next Meeting: Tuesday 8th April 2018.

Minutes reported by [JB. Lallement](#) on 26th April.



Summary of the 11th FOM Meeting

Held on Tuesday 8th May 2018

Agenda <https://indico.cern.ch/event/726420/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Schedule update*
- 4. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 10th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

JB. Lallement reported the status of the linacs ([Annex 1](#)).

The Linac2 had an excellent week with no fault and 100% availability.

The Linac3 source was rather unstable and required frequent tuning and adjustments in order to keep providing lead ions to LEIR. The source still needs some conditioning. The next oven refill is scheduled for tomorrow.

E. Mahner added that, after discussion with BI, the ITM SEMGrid should be available for installation mid of July. Its installation will require a beam stop of two days and could be done together with an oven refill in order to reduce the impact on Linac3 availability. The precise scheduling will be discussed with the LEIR team.

Linac4

S. Schuh reported on the Linac4 status ([Annex 2](#)).

Over the last two weeks, the machine availability was 98% and 86% respectively. The machine was kept running 24/7 with stripping foil tests overnight. They were two very busy weeks: The second Bunch Shape Monitor was successfully commissioned, the faulty pressostat that was causing ventilation interlocks was replaced, the BI team checked the status of the different SEMGrids and wire-scanners, OP performed a source cesiation with the Autopilot application under the supervision



of the source expert and various chopping patterns were tested. The list of the different faults and issues that occurred during the last two weeks was given.

B. Mikulec asked how the source intensity drift following the cesiation could be compensated. **S. Schuh** answered that the source generally requires tuning after cesiation or during normal operation. **JB. Lallement** added that the intensity can be maintained adjusting the gas flow of the RF power. The Autopilot application is meant to have these adjustments done automatically.

LEIR

ME. Angoletta presented the status of LEIR ([Annex 3](#)).

K. Cornelis will join the LEIR rota in two weeks' time. During the week 17, EARLY and NOMINAL beams were delivered to the PS for the RF setup. The transverse feedback timing issue was identified and solved. There was a good capture ($10e10$), but the extraction still needed improvement ($4e10$ charges extracted). They experienced few teething problems with the LLRF system. A temporary fix was put in place and it will be followed up by the specialist. The week 18 was effectively pretty short, with no beam to the PS and only Linac3 and LEIR MDs (beam orbit system calibration, injection BPMs, NOMINAL h=3+6 RF setup started).

PSB

A. Findlay reported on the PSB status ([Annex 4](#)).

It was a good week for the PSB with 95% availability and no serious issues to report. On Monday morning the beam could not be sent to ISOLDE during the PS access because of a BT.QNO20 trip (required a 1.5 hour PiPO intervention to fix it). On Thursday night, BTY.QF0119 tripped and required a local reset. The planned dedicated PSB MD on Wednesday took place between 11:00 and 17:15. On Sunday the BI4.SMV10 tripped requiring a PiPO intervention. A high intensity TOF type beam was requested, so the injection was optimized, many things related to RF were tweaked and $1.05E13$ were consistently extracted from R2 (now available for the users). A high intensity LHC25ns with at least $260E10$ per ring, so 4 rings of $2.75E10$, was prepared and is ready for PS MD next week.

ISOLDE

A. Rodriguez reported the status of ISOLDE ([Annex 5](#)).

It was a pretty good week for ISOLDE.

On GPS, cadmium isotopes were delivered to Solid State Physics users on the GLM line until Wednesday morning. A new target was installed the same day and the new set-up of the GHM line was ready by Friday afternoon. No major problems to report.

On HRS, a new target was installed on Monday morning and several germanium isotopes were sent to the COLLAPS users on Tuesday after some problems with the cooler/buncher have been solved. They have been taking beam since then. However, the beam transmission through the cooler/buncher degraded over time and several adjustments were needed during the week. Some problems with the front-end ion source and HT trips due to overheating of the target also occurred.



ISOLDE Users

K. Johnston said the experiment on HRS was COLLAPS who were using laser spectroscopy to measure the hyperfine properties of Ge isotopes. This is a new molecular beam at ISOLDE and the production mechanism is still not fully understood. As a result, the experiment had to deal with significant impurities in the beam. However, as Ge isotopes haven't been measured before, all data which were measured were new, but the more exotic cases weren't possible. These are beams that need a lot of development.

PS

D. Cotte reported the status of the PS ([Annex 6](#)).

The PS had an availability of 95%. Beams were delivered to all destinations during the week. TOF, AD, EAST_North, IRRAD-CHARM and LHC beams are within the specifications. The BCMS beams for the LHC fillings are ready with 48b (with 1.3E11 ppb, and 1.1/1.0 mm.mrad @ extraction). On Tuesday 24/4 an access was given to change the final amplifiers of C76 and C81 (several interventions could take place in the shadow). The cooling issue related to ZT10.QDE01 was fixed by cleaning and purging the circuit allowing now nominal operation for EAST at 6 GeV/c. The LHC fillings suffered from failure in one of the 40MHz cavities. The MTE intensity is being ramped up. The East Area operation (IRRAD) is limited to 5 cycles/SC due to RP constraints (PAXRP502 alarm level - similar loss levels as last year). There were several trips of the kicker KFA71 (mainly module 9) and investigations are on-going. There were also repeated trips of C66 (circuit breaker to be changed - tbc) and of C202 (water flow & connection to ground). The integrated intensity delivered to nTOF reached 3.65e18 (16.8% of yearly statistics). The EARLY and NOMINAL lead beams were prepared.

East Area

B. Rae said that being able to send nominal energy beam to T10 was very good news.

East Area Users

H. Wilkens said that the users were happy with the Supercycle composition, especially IRRAD and the North branch.

nToF Users

There was no report.

AD - ELENA

B. Dupuy reported the status of the AD and ELENA ([Annex 7](#)).

The AD was restarted with a water leak in the target. During week 17, the specialists continued the adjustments on the Stochastic cooler, on LLRF and on cooler electronics. The beam was not optimal and orbits were far from the reference. The polarity of the DR.DVT4408 and DR.DHZ2904 magnets



was found to be inverted. The application for the emittance measurements does not work since the scrapers renovation.

The AEGIS and ALPHA experiment suffered from horizontal position variations.

B. Dupuy also stressed the point that any change in the Supercycle affects the beam delivery to the AD and to the experiments. It can represent up to 20% less shots per day.

Last week was the first week for physics with 3 sessions of Pbar for ELENA. There were a few issues related to RF cavities (c10-25 and C10-26), to the injection septum DR.SMI5396 and to the DR.QUAD.

Among H⁻ beam at 100 keV, ELENA also saw a first Pbar beam at 85 keV. The Ecooler installation was completed.

B. Mikulec asked whether YASP was used in the AD to allow for kick response measurement to identify polarity issues. **B. Dupuy** answered positively, and that was how they managed to find the steerer magnets polarity inversion.

Concerning the issue with the emittance measurement application being affected by the renovation of the scrapers **M. Gourber** said that the work induced by this renovation might have been underestimated.

H. Vincke asked if the water leaking from the target was activated. **B. Dupuy** answered that it is, but there is a weekly check of the reservoir level. The leak will be fixed once a new seal will have been manufactured. The IEFEC is following this issue.

AD users

H. Wilkens said that the users were worried about the leak that it might result in important downtime. **R. Steerenberg** said the plan was to repair it before LS2.

SPS

F. Velotti reported the status of the SPS ([Annex 8](#)).

The SPS had an availability of 87%. The SFTPRO intensity was increased on T6 up to 120e11 ppp. The QF regulator was replaced (with the one from last year) for better spill quality. Unfortunately, the 50 Hz suppression induced a low frequency broadband noise. The LHC BCMS and standard beam are in good shape, quality degradation coming from the PS cavity issue. There were several issues related to cooling during the week (LSS6 septa filter, BB3 cavity and T10). The scraper position is drifting and that induces a delay in scraping between H and V planes. The gap of the LSS2 ZS septum had to be increased to lower the spark rate (voltage was increased as compensation). Due to faulty BLMs almost half of the beam was "extracted" on the MSE. It caused a vacuum spike at the MSE and consequent trip of the MSE PC as well. After investigations, it was found that the first 16 BLMs in LSS2 and all other LSS BLMs were not triggering a beam dump when losses were above the thresholds. The beams to the North Area were stopped on Saturday evening and BI expert was called to solve the issue. The beams to the NA were restarted at about 2 AM when the SW interlock functionality was back in place. On Sunday morning, BI experts solved the software issue that made the HW interlock not working. The



BLM were re-qualified and the NA physics restarted normally. Procedures to test the BLM interlock functionality are being discussed.

AWAKE is taking the beam for 3 days this week and HiRadMat started yesterday.

K. Cornelis and **L. Jensen** are following-up the LSS2 BLM issue.

North Area

B. Rae said that NA62 was complaining about the ripple. **F. Velotti** answered the issue was now solved.

North Area Users

H. Wilkens reported on an issue related to an access door in NA62. Some of the doors going into unsafe state induce the loss of the patrol. **B. Rae** said he was following this up and the access system team will intervene tomorrow.

AWAKE

E. Gschwendtner said that they had proton and electron beams last week to test different systems. This week is devoted to installation. They will restart with beam next week.

LHC

M. Zerlauth reported on the LHC status.

It was a very good week with 85% availability. The intensity ramp-up was completed on Saturday with 2556 bunches. A half day access is scheduled for tomorrow and the physics will resume in the afternoon. There is no special beam request for the week.

CLEAR

There was no report.

TI

J. Nielsen reported on the events of the 2 previous weeks ([Annex 9](#)).

On Wednesday 25.04 at 15:49 SPS beam was lost due to a trip of the compensator (BEQ3). On Thursday 26.04 at 01:23 there was a low-level alarm on FDED-00021 cooling circuit. The TI operator on-site managed to fill the circuit manually and restart the pumps (CRYO North Area alarms shortly after). After investigations it was seen that the pressure from the North Area cooling towers was too low and had decreased since several hours. The piquet found that a motor on an automatic filter was broken, which had caused the pressure decrease. When bypassed all went back to normal. On Friday 27.04, there was a trip of the cooling towers for the station FDED-00049, which supplies LEIR and



LINAC3. The piquet went on-site and found the cooling towers stopped, as well as the distribution pumps. No faults were found on-site, and the station was simply restarted. More investigations will take place. There was an electrical perturbation on Sunday 29.04 at 06:41 that tripped the Booster and was noted by 513 operators (who saw the lights flicker!). EDF/RTE confirms a mono-phased fault on the 400kV line Chaffard-Grandville. The same day at 09:40, there was a cooling fault in target area TCC8, which caused an interlock on the beam in the North Area. The pump tripped immediately after the reset. It was switched to the secondary pump and an access is planned to investigate further. At 22:18 an electrical perturbation tripped all the machines. RTE confirmed a glitch on the 400kV line of Genissiat. On Tuesday 01.05 at 12:16 there was an evacuation in extension of building EHN1 due to a fire alarm. The fire alarm was caused by soldering works in the building, and the IS37 did not include the correct sensors. On Saturday afternoon the demineralized water circuit in BA2 tripped. Both CV and SEPTA piquet were contacted, SPS operators saw also a vacuum spike at the same time. Temperature readings were showing 3000 degrees (false reading). The circuit was restarted without any problem, and more investigations will take place between the groups. Yesterday at 9:23 there was a trip of demineralized water BA2 with FDED-00011 and alarms on UPS EBS22/A2 at the same time. The UPS had a failure and caused a spike that tripped the PLC of the cooling station. The vacuum sector valves are also powered from this system and closed at the same time.

3. Schedule update

R. Steerenberg presented the new injector schedule version 1.5 ([Annex 10](#)).

The new version includes the update of the end date of the Linac4 reliability run, the redistribution of MD time (reduced MD on Wed. 09.05 to 4 hours, extended MD on Wed. 03.10 and 24.10 to 13 hours), the updated LHC MD blocks and the additional Linac3 oven refill on the 03.12.

After discussion, it was agreed that the exact date of the last Linac3 oven refill could be re-discussed when closer to the end of the run.

H. Bartosik said that because of tomorrow's MD, there will be no beam to the North Area from 8:00 to 12:00.

4. AOB

There was no AOB.

Next Meeting: Tuesday 15th May 2018.

Minutes reported by [JB. Lallement](#) on 8th May.



Summary of the 12th FOM Meeting

Held on Tuesday 15th May 2018

Agenda <https://indico.cern.ch/event/728566/>

1. *Follow up the last FOM*
2. *Status of the machines*
3. *Schedule updates*
4. *AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 11th FOM](#) were approved.

No follow-ups were reported.

Linac2 & Linac3

R. Wegner reported on the status of the linacs ([Annex 1](#)).

Linac2

Linac2 had an excellent week.

Linac3

Linac3 had an average week. Only the oven refill on Wednesday was demanding. After the refill, many readjustments were necessary to get the beam back to normal operation.

Linac4

S. Schuh reported on Linac4 ([Annex 2](#)).

The past week was characterized by a continued set of measurements and a few hardware failures while running different users and chopping patterns. The frequent Watchdog trips over the past weekend (reported in W19) were understood as a combination of source intensity drift after cesiation plus SIS glitches plus Buncher3 dropping out. The steady current drop over the weekend plus the unstable running gas injection required the switch to a second working point for the gas injection valve. There was a vacuum alarm in the evening of 7/5/2018 for PIMS1, as well as the evening of 10/5/2018 - for which a simple restart with the Sequencer did not work causing the linac to be down for both nights. The vacuum alarm for PIMS1 reappeared twice on 11/5/2018. An arc detector interlock on PIMS9-10 in the evening of 10/5/2018 caused the L4 to be off until 11/05/2018 - it needed a HW reset. There were three trips of the source RF and continued SIS random trips. Various



tests and measurements on the chopper were performed: The remnant current of the chopped beam is at the level of 0.16 mA (~1% level), which is at the limit of BCT resolution (1% accuracy in measurements and 0.1 mA minimum current). The rise/fall times of the chopper have been measured to be at the level of a few ns (at the limit of device resolution again). The chopping difference between MD1 and MD5 has been measured. A new version of cruise control application was used to test chopping away correctly an additional part of the beam head with the chopper alone. This allows for 800 us in total between STARTCHOPPER and STOPCHOPPER - but this pulse-length pushes the operation to the predicted chopper limitations, where failures on the pulser unit were observed (protection fuses and power devices blew inside the units). Further ToF tests with cavity detuning were performed. Tests with stripping foils overnight were continued, and the LLRF setting-up on the debuncher was started.

Linac4 was switched off just before midnight on Friday 11/5/2018 to cool down for the start of the ETS RF intervention on Monday 14/5/2018.

Linac4 is now shut down for three months.

LEIR

R. Alemany reported on LEIR ([Annex 3](#)).

LEIR had an excellent week. Quick recovery after the source refill was achieved. Nevertheless, there is a significant shot to shot variation. The only faults reported were the power converter trips of extraction kickers and the extraction BPMs. On Monday the 11th there was excellent progress on the white rabbit B-Train. The white rabbit is working with the new sensor and the communication with the low-level RF works showing more stable loop behaviour. Also, the beam synchronization and extraction to PS is functional now. A source of intensity limitation due to a pole face winding on a sextupole, which is connected to the dipoles, caused a tune variation, leading to instabilities. Mostly high-intensity injections are affected. It is now disabled. The plans for this week are the BPMs in the transfer line, the setup of the nominal beam, the h3+h6 RF setup to send the beam to the PS, with a new operational mode (3 bunches LEIR to PS and 75ns spacing in PS).

PSB

V. Forte reported on the PSB ([Annex 4](#)).

A good week for the PSB was reported, with an availability of 96%. Longest OP-blocking fault (~3.5 h) concerned some steerers in the BTP line. A follow-up of LHCIndiv VdM beams setup (needed in week 24 by LHC) in collaboration with PS OP took place. High-intensity LHC cycles for PS and LHCINDIV cycles with different transverse emittances beams for an SPS MD were prepared. Some MDs on BCMS25 brightness and MTE were carried out. Tests on the hotspot in Section 5 (at the entrance of BHZ502) showed attenuation of BLM levels for several beams (ISOLDE, AD, LHC25, BCMS) utilizing a vertical steerer (BR2.DVT13L4) and additional other fine tunings.

ISOLDE

S. Mataguez reported on ISOLDE ([Annex 5](#)).



On GPS, from Monday 7th evening Mg isotopes (from 20 kV to 50 kV) were delivered to IS634 (EC-SLI) users on the GHM line until Friday midday. A successful run was performed in excellent target conditions.

On HRS, a new target was installed on Monday 7th afternoon, and ISOLDE started to deliver stable beam (78Kr) to the ISOLTRAP (IS642) users on Tuesday evening. The beam exited with a large angle from the target. On Wednesday, a proton scan and yield measurements were done. Users have been taking beam since then, but they did not get 70Br as they wanted. Saturday 12th their turbo pump controller broke, and this put an end to their experiment.

ISOLDE Users

K. Johnston sent a summary from the users side last week at ISOLDE.

On GPS 27Mg was taken by the emission channelling collaboration investigating the role of Mg in optoelectronic materials. This run went very well, extremely stable conditions during the run and very good data were taken.

On HRS it was more difficult: ISOLTRAP wanted to measure the mass of 70Br, which is a super allowed beta decay, in an effort to improve the precision of the Q-value. The beam of 70Br was heavily contaminated and the expected molecular sideband of AlBr didn't appear to be present. However, while trying to deal with these impurities in the beam, the experiment lost a turbo pump on their buncher on Saturday morning. A replacement couldn't be found so the experiment was forced to stop.

PS

D. Cotte reported on the status the PS ([Annex 6](#)).

The PS had a good week, delivering the scheduled operational and MD beams. Last week, the PS beam availability was around 94%. Nearly half of the downtime resulted from the injector side (~4h). On the PS side, the time was shared between septum magnet, power converters, and a faulty PLC in nTOF. On Monday, ZT8.BHZ01 was found in error and un-resettable. The first line was called and managed to restart the power supply after replacing a faulty VERO power supply (36 min without beam for EAST_Irrad). On Wednesday, all three septa showed problems during the extraction of the beam to the EAST AREA. The PIPO and a TE/ABT specialist restarted all of them (3h45 without beam for EAST AREA). Finally, Saturday morning, a faulty PLC on the TOF target cooling system triggered an external condition, which prevented the PS from sending the beam to nTOF. TI called the EN/CV piquet. He intervened and solved the problem (1h15 downtime for nTOF). All along the week, BCMS beams were delivered to SPS/LHC. Ion beam setting up continued in the PS and the MTE beam was optimized with an increased intensity around $1400e10$ ppp.

East Area

B. Rae said that there was nothing special to report.

nToF



D. Macina sent a summary of nTof.

We are changing experiment and collimator in EAR2. From our side, Tuesday will be a day where we request no beam from ~ 9:00 to ~ 17:00 to finish the installation. It is also my understanding that there will be no dedicated MD for the PS on Wednesday, so there will be no beam interruption.

AD-ELENA

AD

L. Bojtár reported on the status of AD and ELENA.

AD was working well, with very little downtime, only minor problems with power supplies. AD is back to nominal performance after the very short start-up. The water leak at the target is getting worse, the cooling water tank needs regular, more frequent filling up.

T. Eriksson added that the leak is increasing and the team is planning an inspection, which also will be discussed with the AD users.

ELENA

ELENA had a good week.

AD/ELENA Users

H. Wilkens reported on the AD/ELENA Users.

There is an update of the AD schedule. The ALPHA-G detector will be installed during the summer and all the beam time from July will be moved to the end of the year.

SPS

K. Cornelis reported on the status of the SPS ([Annex 7](#)).

The HiRadMat BLM experiment finished Tuesday night. The ATLAS experiment had to be postponed to this week. A long parallel MD cycle was carried out on Tuesday (instead of Thursday). The CRAB cavity synchronization studies and longitudinal losses on the 25ns beam were started and will be continued. The weekend was very productive even with AWAKE in the supercycle. Since last Wednesday, there is a dying magnet: inter winding short (MBB 30470?). It is currently stable, having only a small effect on the beam. A big problem is the ZS4, which is sparking since last night. The problem is not solved although the piquet was working on it the whole night. There was no beam this morning, only to fill the LHC, and the ZS was put to minimum voltage. The ZS4 affects mainly the North Area extraction. The investigations will be continued after the fill, with the assumption that there is a vacuum leak.

North Area

B. Rae reported on the North Area. The North Area had a good week.

North Area Users

H. Wilkens reported on the North Area Users. NA62 reported that they are very happy.



AWAKE

E. Gschwendtner reported on AWAKE.

AWAKE had a good weekend, followed by three days of access work. Restart takes place tonight or tomorrow.

LHC

E. Bravin reported on the status of the LHC.

The LHC had a good week. For the next three weeks, standard physics is planned.

CLEAR

A. Curcio reported on CLEAR.

The interventions of the last week concerned the photocathode laser alignment (14/05/2018). The detection of coherent transition radiation at THz and gun studies for bunch length optimization were achieved. No significant issues were reported. This week the characterization of the emittance for the next experimental campaign on plasma lensing is foreseen.

TI

R. Ledru reported shortly on the status of TI. No major issues were reported.

2. Schedule updates

B. Mikulec presented the injector schedule ([version 1.5](#)).

G. Rumolo mentioned that only the North Area is affected by the MD block on Wednesday.

3. AOB

There was no AOB to report.

Minutes reported by [S. Hirlander](#) on 16th May.



Summary of the 13rd FOM Meeting

Held on Tuesday 22nd May 2018

Agenda <https://indico.cern.ch/event/730870/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. ZS4 intervention and status*
- 4. Schedule update*
- 5. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 12th FOM](#) were approved.

2. Status of the machines.

LHC

E. Metral reported the status of the LHC.

There was no major issue last week. The integrated luminosity reached 13.1 fb⁻¹. On Thursday, the LHC will request a PROBE beam in order to proceed to a high beta cycle. Only standard beams will be requested this week and no access is scheduled.

F. Tecker and **M. Fraser** commented that the LHC operation should consider tomorrow's dedicated MD and plan for a fill before the MD start.

Linac2 & Linac3

G. Bellodi reported the status of the linacs ([Annex 1](#)).

Linac2 had another excellent week with 100% uptime. An intervention needs to be scheduled to replace a degrading RF tube on tank1.

After discussion, the intervention was approved to take place today between 10.30 and 12.00.

Linac3 operation was perturbed by breakdowns in tank1 that started on Wednesday. Several problems were diagnosed by the RF team and the normal operation was recovered on Thursday. The



source was pretty unstable during the week-end with several HT breakdowns and required frequent tuning. An oven refill is scheduled on Thursday.

LEIR

S. Hirlander presented the status of LEIR ([Annex 2](#)).

The MD was perturbed by the Linac3 RF issues on Wednesday. After the H3+6 setting-up on Thursday, the beam was successfully sent to the PS on Friday. The week-end operation was affected by the Linac3 ion source fluctuations and by issues on the CRF41 cavity.

PSB

F. Antoniou reported on the PSB status ([Annex 3](#)).

It was a very good week for the PSB with an availability of 97.6%. The main downtime came from a trip on BTM.QN005, which required a Piquet intervention. The phase noise reliability run started this week and was applied to the LHC25, BCMS and MTE beams successfully. The application to the AD beam is in progress. In preparation of the commissioning of an LIU Q-strip converter a successful test on the hierarchy of the Q-strip was performed. Concerning the hot spot in section 5, some beam steering (orbit correction) was performed and effectively reduced the BLM reading in the area. Several MD studies took place this week as well, focusing on: Phase noise studies, PSB transverse feedback commissioning, Finemet cavity setting-up and setting up of an alternative working point cycle for optics and space charge studies.

ISOLDE

E. Siesling reported the status of ISOLDE ([Annex 4](#)).

The week has been very smooth for ISOLDE with no specific issues.

GPS was used until Wednesday for MD on the new fast tape station. The target was changed on Friday for a new #653 UC Ta target. The target has been heated and setting-up is starting.

At HRS the target was changed for the used, but well performing, UC target #618. It was outgassing quite a bit, which made heating it up a slow process. The stable beam setting-up went very smoothly, including the ISCOOL (RFQ) in bunched mode. Proton scan and quick yield check were done on Wednesday when the central beamline became available and stable beam tuning to the VITO experiment started right after. The VITO users started taking radioactive Na beam as of Friday afternoon once they had solved a vacuum problem in their setup. They have been running smoothly since.

On Wednesday the very first MEDICIS target has been put in place (#646 M). They will take the HRS proton beam in parallel with the HRS users. The target will be retracted once the number of protons sent to HRS will reach $5E18$. Operations are handled by the MEDICIS operation team in cooperation with the ISOLDE users and supervisor.



ISOLDE Users

K. Johnston said that last week, the users were running on HRS taking ^{26}Na to the VITO beamline. This is a biophysics experiment using beta NMR to probe DNA structures. Although this is a straight forward beam for ISOLDE to produce the experiment is extremely challenging. Conditions for the experiment were excellent over the weekend with very little downtime; it will take a while for the data analysis to be completed and to judge whether the experiment has been a success or not.

PS

F. Tecker reported the status of the PS ([Annex 5](#)).

The PS had an excellent week of smooth running, with beam availability of 97%. The main downtimes were due to an issue with BI.DVT30 in the PSB, an access in the PS to fix the C56 gap relay on Friday and a trip of the C66 cavity with C11 not working. The AD beam was further affected by a magnet power converter trip (DE1.BHZ10) and an opening of an access door. The intensity on SFTPRO was increased to 1600×10^{10} protons. The ion beam setup is ongoing. The EAST beams were optimized to stay below the alarm level on the radiation monitor PAXP502. Even though the beam and the settings are similar to last year, the radiation level has increased. Tomorrow, a dedicated MD on the transfer line PSB to PS matching is planned. The status of the different beams was given. The nToF delivered integrated intensity is 9% ahead of schedule.

Concerning the EAST beam operation that is very close to the radiation alarm level, **H. Vincke** commented that all the checks were done and one can continue running like that for the moment.

East Area

B. Rae said that everything went fine in the East Area.

East Area Users

H. Wilkens said the users were happy.

nToF Users

D. Macina said the users were very happy.

AD - ELENA

P. Freyermuth reported the status of AD and ELENA ([Annex 6](#)).

AD did not encounter any major problem this week and had an availability of 93%. After a cool-down time, the target was inspected and the water leak was found to be stable. An issue with the injection septum was efficiently handled by PS operation.

A lot was done on ELENA last week (kick response, tune corrections...). The lowest p-bar energy was almost reached without Ecooling. Unfortunately, one of the two horizontal BBQ strip lines broke, but one can continue with the other one for the moment (although with lower signal).



T. Eriksson commented on a question of **H. Vincke** that the AD target water leak looks pretty stable, but still requires regular checks.

AD users

H. Wilkens said that because of the holidays, the helium delivery had to be optimized. The ASACUSA experiment will start their positron trap from next week and will therefore require more helium.

SPS

V. Kain reported the status of the SPS ([Annex 7](#)).

It was an eventful week, but fortunately the machine is now back in normal operation. In the night from Monday to Tuesday the ZS4 started sparking during LHC filling. Operation for fixed target had to be stopped and could not be resumed despite the expert working. On Tuesday the issue was diagnosed to be a broken HV feedthrough. An intervention was planned for Wednesday morning where ZS4 had to be disconnected and secondary vacuum established at the feedthrough location. The intervention was successful. Slow extraction could then be re-established on Wednesday in the afternoon without ZS4. The MST girder was aligned slightly further towards the circulating beam. The losses on TPST and MST1 are slightly higher than before the intervention, but still acceptable.

The LHC was reporting again issues with losses and steering in TI2. The INDIV beam having also very bad trajectories in both lines, TI2 and TI8, it became clear that the orbit in the SPS must have changed and be different for the BCMS LHC1 and INDIV cycle. It was finally traced back to the orbit correctors in BA2 having lost their settings and loaded some other settings. The BA2 FGCs were/are frequently re-booting due to the logging that was put in place for the extraction elements. The logging service does not have the correct RBAC rights for these FGCs. A fix will be put in place. The problem with the FGCs rebooting and losing their settings has been fixed on Thursday morning. The MDs on Wednesday were unfortunately cancelled due to the ZS intervention in the morning and the LHC filling investigations in the afternoon.

On Thursday evening a bad injection through TI8 led to massive losses on the transfer line collimators and quenched Q7R8. Investigations afterwards revealed that the losses had been caused by a coupled bunch instability that had developed in the horizontal plane after the scraping and caused the last bunches of the second and third batch to oscillate wildly. The bunch-by-bunch trajectory recording in the LHC IQC showed this.

Measurements that are carried out once per shift indicate that the interturn short in MBB.30470 is slowly becoming worse.

The HiRadMat ATLAS pixel experiment was carried out and finished Tuesday night. Only one third of the HiRadMat BTV experiment was executed on Friday. The spark rate on ZS5 being high with more than 144 bunches, ABT recommends to do HiRadMat with high intensity without slow extraction. The ion preparation cycle was in the supercycle several times during the week without beam. The ion beam preparation is ahead of schedule.

Concerning the FGC issue, **M. Gourber** commented that it affects only the FGC91 class and a fix was released. The logging issue is being followed up by EPC.



Concerning the MBB issue, **K. Cornelis** commented that there is still some margin to wait until the next technical stop. As it will be a vacuum intervention, it will require at least 24 hours.

B. Balhan reported on the ZS4 status and intervention ([Annex 8](#))

In the night from Monday to Tuesday, a high spark rate interlocked the ZS generator. After an expert intervention and successful conditioning up to 250 kV, the spark rate did not improve and a vacuum interlock appeared at 6.30. After investigations, it was found that a first vacuum degradation developed on May 14th. In the end, the high spark rate and the poor vacuum conditions led to a leak on a feedthrough. The intervention took place on Wednesday morning (16.05), and consisted in emptying the insulation liquid from the ZS4, disconnecting the tubing on the regeneration station, installing a vacuum membrane pump equipped with a Pirani gauge and disconnecting and grounding the ZS4 cathode on the HV distributor. Once the intervention was completed, the vacuum was quickly recovered in the sector. The collective dose was kept below 200 μSv .

The ZS voltage was then increased from 220 kV to 230 kV and an extraction test with low intensity beam showed a 3 mm beam displacement at the TSPT min-scanner at 2175 and the MST girder was realigned upstream and downstream the scans. The losses were found to be slightly higher on TSPT, MST and MSE, but lower than during the 2017 run. The intensity was then ramped up to nominal. The situation looks stable at the moment and one could consider running like that until LS2, but there is no margin on others ZSs. If their behaviour degrades or losses become too high, the ZS4 will have to be replaced.

In case a replacement of the ZS4 is needed, a 3 week to 1 month cool-down time should be considered before any intervention.

North Area

B. Rae said that on Thursday morning a water leak developed on the quadrupole Q22 in P42 (last quad before T10) and induced a short circuit. The magnet was disconnected and cannot be used anymore. On Thursday afternoon a new optic was applied and reduced the beam loss to about 20% in T10. On Friday afternoon, full beam performance was recovered with a new efficient optic. NA62 will now have a detailed look at the data. Depending on the findings the magnet could have to be replaced (8 days of works). A visit of TCC8 and BA81 is scheduled tomorrow for a better time estimate. Some feedback will be given next week.

North Area Users

H. Wilkens said that the COMPASS experiment started data taking as well as NA64. The intensity request for the NA is now at the highest level.

AWAKE

E. Gschwendtner said that they were taking beam since last week. The e⁻ beam line setting-up was pretty difficult and requested quite some time. Two corrector magnet power supplies had to be



replaced in order to overcome some magnetic coupling. They will continue running like that this week. Discussions will then take place whether it should be fixed or not.

CLEAR

There was no report.

TI

J. Nielsen said that there were few minor events. On Tuesday morning, the BA4 demineralized water cooling station tripped. The PLC program had to be reloaded. On Wednesday there was an electrical perturbation due to thunderstorms, confirmed by EDF/RTE, on the 400 kV line Albertville / Montagny. On Friday the BA3 cooling station tripped because of an issue with the level reading of the demineralized water production in Meyrin. On Sunday night, an electrical glitch was observed by the SIG but not seen by EDF.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.5).

Ion beam to the SPS is already expected this week. Tomorrow's MD is dedicated. There will be no beam from the SPS to the North Area and no beam from the PS to any of the experiments tomorrow from 8.00 to 18.00.

4. AOB

There was no AOB.

Next Meeting: Tuesday 29th May 2018.

Minutes reported by [JB. Lallement](#) on 24th May.



Summary of the 14th FOM Meeting

Held on Tuesday 29th May 2018

Agenda <https://indico.cern.ch/event/731972/>

- 1. Follow up the last FOM*
- 2. Status of the machines*
- 3. Schedule updates*
- 4. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 13th FOM](#) were approved.

No follow-ups were reported.

Linac2 & Linac3

D. Kuechler reported on the status of the linacs ([Annex 1](#)).

Linac2

Linac2 had a good week.

Linac3

Linac3 had a week with limited success. The oven had to be refilled on Thursday morning, and it seemed to be completely empty. The beam was back at 16:30. On Friday, after the tuning, the beam was very good.

LEIR

K. Cornelis reported on LEIR ([Annex 2](#)).

It was a short and good week for LEIR. No blocking faults were reported. The new B-train is working, but a remaining FESA class problem has to be resolved. The 75 ns beam is working and needs still to be optimized. The Nominal Cycle was sent to SPS and accelerated on Friday.

PSB

S. Albright reported on the PSB ([Annex 3](#)).

It was an excellent week for the PSB. Only small faults occurred. The longest downtime was caused by the linac intervention and a kicker fault. All operational beams are available. The LHC e-cloud beams



are progressing. The LHCINDIV_VdM beam was transferred to SPS. A dedicated MD allowed sending beam to ISOLDE and the dump using new optics. The White Rabbit Reliability Run showed a firmware bug, and CO & RF are trying finding a solution. The Finemet cavity revival is ongoing, and the first results look good.

ISOLDE

L. Fadakis reported on ISOLDE ([Annex 4](#)).

A calm week was reported for ISOLDE.

ISOLDE Users

K. Johnston sent a summary from the users side last week at ISOLDE:

From Wednesday onwards last week the ISOLDE decay station was taking neutron rich Cu to measure the beta decay into Zn isotopes probing the proton shell structure around near doubly-magic 78Ni . Although ISOLDE was performing very nicely with more or less full up-time, the experiment itself had many problems with their tape station breaking 4 times during the course of the run and many issues with the DAQ. In the end good data were taken on 78Cu which was the main goal of the experiment but systematic data across the isotopic range from 70Cu – 78Cu wasn't possible, so the final physics goals of the experiment weren't achieved.

PS

A. Guerrero Ollacarizqueta reported on the status of the PS ([Annex 5](#)).

From 01:00 to 18:00 on Thursday, there was no beam in PS due to an extended intervention on the SMH42 (see next point). After the reparation, the currents for all cycles had to be adjusted. Two power converters caused another downtime in total of 1.5 hours. The SPS played the ILHC100 beam, and the B-field was slightly changed at extraction. The VdM, LHC25 and BCMS low-intensity beams were prepared. The work on the LHC100ns is ongoing. On Wednesday, there was a dedicated MD including SPS. The BT and BTP optics were modified, and the LHCINDIV was prepared for SPS with these optics. This MD will be continued next Wednesday.

SHM42

M. Hourican reported on the SMH42 ([Annex 6](#)).

A fatal failure of the stripline of the septum 42 occurred, which had only been in service since the YETS. It was a very clean break without signs of fatigue, which never has been seen before. A cracked insulator caused loss of tension on fixing screws and eventual loosening of the screws to such an extent that a short circuit was made. An in-situ repair was performed. The overall downtime was almost 17 hours. The actual time to dismantle, repair feed-through assembly and replace the stripline was about 3 hours. Mitigation measurements are planned (see [Annex 6](#)), and the SMH42 will be replaced by the new PS eddy current injection system in LS2 to avoid such problems in the future. **M. Hourican** thanked all personnel involved from TE-ABT, TE-EPC, and RP.

East Area

B. Rae said that there was nothing special to report. He only mentioned the start of the CLOUD experiment on the 11th of June.



nToF

There was nothing special to report.

AD-ELENA

AD

T. Eriksson reported on the status of AD and ELENA ([Annex 7](#)).

AD was working well. On Thursday there was an intervention on the access system. The recovery from it took some time, and a broken relay was identified in the RF. At startup also a problem with the orbit correction occurred involving the e-cooler. Two issues on Friday were reported. One concerned a power supply in the extraction line, which was switching on and off. The other affected the power supplies of the extraction system in building 195. They were overheated, and the doors were opened to cool them down. The problem is already fixed. The ALPHA experiment suffered a bit from the access intervention.

ELENA

ELENA had a good week.

50% deceleration efficiency was obtained.

An issue of the H- source was reported (a transformer broke down and has to be replaced). The tune measurement system is not working correctly (intervention planned). The SEM made some progress.

B. Mikulec asked about the progress of the electron cooling.

T. Eriksson said that there was no electron beam so far.

AD/ELENA Users

H. Wilkens reported on the AD/ELENA Users.

The ASACUSA RFQ is working and the intensity increased by about 50-70%.

SPS

K. Cornelis reported on the status of the SPS ([Annex 8](#)).

It was a very good week for SPS. Test software in NA power converters was deployed during an MD. An access for an RF pick-up controls crate was reported. A problem with BLR (ring beam loss), caused by the new software deployed, occurred. On Wednesday, the crab cavities were 'crabbing' for the first time. On Friday, the Nominal ion beam was accelerated in the SPS with good transmission. On the weekend AWAKE accelerated electrons to high energy.

North Area

B. Rae reported on the North Area.

As a follow-up from last week concerning the quadrupole Q21 in P42. NA62 is happy with the data. The magnet will be replaced during the next technical stop. NA62 suffers from high spikes in intensity.

K. Cornelis added that these spikes come from errors in changes involving new MD cycles, which occur only at particular moments.



North Area Users

H. Wilkens reported on the North Area Users.

Nothing special was to report.

AWAKE

E. Gschwendtner reported on AWAKE.

It was a very successful week for AWAKE. A lot of time was spent with screen flipping and orientation to align all different beams towards each other, which had to be done carefully. The experiment profited from the stable beam demanded by LHC. On Friday night, there was the first injection of electrons into the plasma and the first acceleration was possible. Moving to the nominal parameters gave a high acceleration energy. Detailed analysis and calibration of the data is ongoing and will be published. **E. Gschwendtner** wanted to thank everybody involved.

CLEAR

A. Curcio reported on CLEAR ([Annex 9](#)).

A good week was reported for CLEAR.

LHC

J. Wenniger reported on the status of the LHC.

LHC was working well. During the weekend, there were four rare cryogenic faults, which resulted in some downtime.

TI

R. Ledru had nothing special to report.

2. Schedule updates

B. Mikulec presented the injector schedule ([version 1.5](#)).

H. Bartosik mentioned that the MD block was the same as last week. There will be no beam for the PS and the North Area since there will be the crab cavity in and in parallel there will be the optic studies from the PSB to PS. Only ISOLDE will receive beam.

B. Mikulec continued by mentioning the LHC MD block in week 24. In week 25 there is the UA9 run, COLDEX, and the technical stop. Next week the facility coordinators will present the draft of all interventions, so everybody was reminded to submit the IMPACTs during this week.

3. AOB

LEIR access

D. Chapuis announced a maintenance request from 30th May 08:30 to 31th May 17:00 ([Annex 10](#)).



Advancing EN-EL activities from LS2 to RUN 2018

J. Devine presented a request to advance certain EN-EL activities from LS2 to the RUN 2018 ([Annex 11](#)).

Due to the huge workload during LS2, it was decided to advance projects having a minimal impact on the machines. The schedule can be seen in ([Annex 11](#)). The following works are foreseen before December 2018:

- SPS: Lifting of floor tiles for electrical visual inspection in BA1-2-3-4-6 for EL SPS consolidation and the Fire Safety project
- Building 151: Installation of new general services infrastructure
- Building 37: Electrical general services refurbishment
- Building 361: Electrical general services refurbishment (lighting & power)
- Buildings 355/358: Installation of new general services infrastructure
- PS: ME59-ME6 link

Preliminary VICs have been done for safety.

R. Alemany asked about the possible implications on the ion run.

J. Devine answered that the main risk in all areas is the accidental triggering of an AUG button, in which case the associated machine would be stopped and the power to the building cut.

E. Mahner asked if the proposal of working after the Linac2 stop during the ion run in building 363 (first floor) on the racks was still valid. It might have an impact on Linac3 operation.

J. Devine replied that he was not aware of such a proposal, but he assured to check it.

E. Mahner said that the impact of a power cut in Linac3, especially if effecting the source, could not be recovered in half an hour.

J. Devine said he will check if any work will affect Linac3.

Under the assumption that no potentially disruptive intervention for the ion run will be performed, the activities were approved by the FOM, awaiting final approval by the IEFC.

Minutes reported by [S. Hirlander](#) on 31th May.



Summary of the 15th FOM Meeting

Held on Tuesday 5th June 2018

Agenda <https://indico.cern.ch/event/733953/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. ITS1 activities*
- 4. Schedule update*
- 5. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 14th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

JB. Lallement reported the status of the linacs ([Annex 1](#)).

Linac2 had a rather good week. On Thursday, operation was shortly perturbed by a glitch on the electrical network and an issue with subscription in the SIS. The linac was down for 50 minutes in total, but most of them in the shadow of other PSB downtimes. On Saturday morning, a MEBT buncher cavity tripped and had to be restarted (5 mins downtime).

Linac3 was pretty stable this week. Following a request of the LEIR team, the stripper foil was exchanged on Thursday morning, leading to a loss in intensity in the order of 20 % at the end of the linac. A new set of 4 stripper foils is being prepared for installation during the next technical stop. The next oven refill is scheduled for Thursday.

LEIR

N. Biancacci presented the status of LEIR ([Annex 2](#)).

LEIR had a good week with a 98.1% availability and only short-term faults. A correlation was found between the ETL power converters current and the room temperature. The beam injection efficiency degradation observed on the 27th of May was fixed by fine setting of the debuncher/ramping cavity.



B. Mikulec asked whether the Linac3 pepper pot will be definitively removed. **R. Alemany** answered that there is at least no plan to re-install it this year. She also added that the ETL power converter stability issue is understood and will be solved by upgrading the cards providing the reference current.

R. Alemany asked whether EN/EL had planned some work in building 363 at the end of the year that could affect the ion run. After the meeting, **J. Devine** sent the following information: *"I've double checked within the EL group and I can confirm we have no planned work affecting the electrical distribution in Building 363 during either the proton or ion runs this year."*

PSB

B. Mikulec reported on the PSB status ([Annex 3](#)).

It was a very good week with 99% availability. The weekly run was interrupted three times by resets after electrical glitches. In addition, a few trips of the R2 and R4 C02 cavities occurred during the week-end due to a blocked electrovalve. It was temporarily fixed awaiting intervention during the ITS1. The RF team connected a second power amplifier for the Transverse Feedback system in the horizontal plane to all rings, which caused small issues for R2, traced back to glitches in 2 radial pickups and solved thereafter. This upgrade will be useful in particular for optics MDs. Phase noise blow-up and White Rabbit B-train reliability runs are ongoing.

ISOLDE

M. Lozano reported the status of ISOLDE ([Annex 4](#)).

It has been a very quiet and nice week at ISOLDE with only little downtime due to problematic beam instrumentation upgrades. CRIS took Potassium beams from HRS during all week and on Sunday afternoon IDS started taking Indium from GPS. They will stop today.

ISOLDE Users

K. Johnston said that the CRIS experiment were measuring neutron-rich K beams on HRS. Initial problems with background contamination were overcome with a modified detector setup and excellent data were taken up to 52K. On GPS the ISOLDE decay station resumed on Sunday afternoon with neutron-rich In beams and this has continued since then. Again, the conditions were excellent with very high yields and a very stable machine and good data on ¹³⁴In have been measured. Both experiments have completed their expected program.

PS

H. Damerou reported the status of the PS ([Annex 5](#)).

The PS had an average week with an availability of 94%. The main downtime (6h50) was due to the required replacement of the PFW power converter. Additional downtimes came from few trips of the POPS and an issue with the 40 MHz cavity not following the programmed voltage (not fully understood yet). A variant of the MTE beam with h=1 synchronization in the PSB prior to extraction to the PS has been tested. This scheme allows to unambiguously track the bunch numbering at the PSB-PS transfer



and avoid the need to switch the harmonic of distributed RF signals for the transfer. The LHC-type beam with 100 ns bunch spacing has been revived in the PS. The magnetic cycle is different with respect to other LHC-type beams as the triple-splitting takes place at flat-bottom. It was delivered to the SPS during the weekend. For what concerns lead ions, a new scheme for single bunch with acceleration from an intermediate flat-top on $h=21$ is now operational.

East Area

B. Rae reported on a software issue sending a wrong veto to the beam stopper from time to time. Even though it is not a blocking issue, it perturbed the operation.

East Area Users

H. Wilkens said that except the issue with the veto mentioned above, the users were very happy.

nToF Users

D. Macina said that everything went fine.

AD - ELENA

B. Dupuy reported the status of AD and ELENA ([Annex 6](#)).

On Tuesday, the beam intensity on the target was increased and the leak seemed to be reduced by then. On Tuesday night and Wednesday the operation and the MD program were perturbed by a fault on a power converter. On Wednesday night, the AD extracted beam started decreasing due to orbit jumps at 100 MeV. A new horizontal orbit correction had to be applied. The E-Cooler energy was also adjusted. On Friday, the ring power-supply DR.BHZTR48.49 tripped and First Line intervened. On Saturday, position fluctuations of 3 mm on the horizontal started to appear. Adjustments of steering and e-cooler did not completely solve the issue. A cavity C02 trip required the intervention of a specialist. There are now a lot of instability sources for the optics at 100 MeV and on the extraction lines. It might be a consequence of the issue with the stochastic cooling that occurred last week and the situation is getting now more stable.

There were also a lot of activities going on for ELENA. After the 100 kV transformer failure, the ion source was reconfigured to 85 kV. Pbar injection efficiency and tune measurements were re-established to improve the deceleration efficiency. There were a lot of improvements of the E-cooler power supplies. Orbit distortions were compensated with HV electron beam and measurement and correction of the tune were done throughout the cycle to reduce the losses. There is a mechanical problem with the tune excitation kicker. An X-ray observation is scheduled for this week.

After the meeting, **S. Gilardoni** sent the following clarification concerning the AD target water leak:

- *The leak on the AD target re-appeared after the intensity increase.*
- *There is a clear correlation between increasing the intensity and increasing the water leak.*
- *Currently we lose about 3 l of H₂O in a week.*



AD users

H. Wilkens said that the ASACUSA trap will be cooled down next week and that will require a large amount of helium.

SPS

K. Li reported the status of the SPS ([Annex 7](#)).

This was a very difficult week for the SPS with an availability of 24%. On Monday an issue with the BQM required a 4.5 hour access to check the attenuator controller. In the shadow of the access, an update was made on the BLM software and after coming back from the access, the SIS was interlocking on the BLMs (BA3 dump inhibit). After some failed attempts to work around the problem, it was finally decided to roll back to the previous software version and to fix the issue later during the week. The fix was finally deployed on Friday including integration into the SIS. The dedicated MD for the crab cavities took place on Wednesday. After the MD the power converter MBE2103 did not restart. After investigation it turned out that the power converter transformer has taken serious damage. As there is now spare and the damage cannot be repaired the extraction line will need to be reconfigured. The completion of these works is foreseen by Friday. The DSO tests will need to be redone after the reconfiguration and by that time no beam will be available for the North Area. HiRadMat and the FlexMat program took advantage of the situation as they required shots of high intensity 288 bunches which would have been incompatible to run in parallel with NA physics with the degraded ZS. On Thursday evening the HiRadMat team moved in. The full FlexMat program was completed within three days.

MDs were performed throughout the week, most notably the crab cavity MDs which continued with their program testing higher intensity beams as well as taking a beam through the ramp. A strong blow up was observed on the LHC50NS beam in both planes and it became clear that the machine very likely needs some scrubbing to be able to accommodate the high intensity beams. This was planned for the weekend and could finally be started on Sunday early morning.

Beams to the LHC were successfully delivered. On Thursday night there was another bad injection which quenched the LHC magnets. The chromaticity was carefully raised along the ramp and at flat top by a considerable amount while at the same time keeping an eye on the emittances before extraction to the LHC. Regular monitoring of any coherent activity at every LHC fill (AutoQ) was put in place. Studies of the BCMS beam stability are planned for next week checking also the setup of the transverse damper. Moreover, investigation of the possibility of protection measures to prevent extraction of such unstable beams in the future are on-going.

North Area

B. Rae said they will profit from the beam stop to replace the quadrupole in P42.



North Area Users

H. Wilkens confirmed the users were pretty sad. H2 users went back to Italy and they plan to come back in September. NA62 users were close to reach the statistics they needed and would have required 11 extra days. If the beam is restarted on Friday, they will have 9 days left and that could be OK. H6 users have not found a solution yet. H8 users found a slot in October, but still need to confirm they will get the resources.

AWAKE

There was no report.

LHC

E. Metral reported the status of the LHC.

The LHC is ahead of schedule and is getting close to 20 fb⁻¹. They are now preparing for the MD starting next Tuesday. The TS1 will start right after the completion of the MD. The list of beams requested for the MD was presented ([Annex8](#)). They are all standard beam except the standard_25ns + BCMS 25 ns whose transverse emittance might be a bit too low. One should check the emittances obtained at the SPS.

CLEAR

There was no report.

TI

J. Nielsen said there were a few perturbations on the electrical network but with no large consequence.

3. ITS1 activities.

Linac2 & Linac3

A. Berjillos presented the activities scheduled for the next technical stop in Linac2 and Linac3 ([Annex9](#)).

There are no major interventions scheduled in Linac2, just normal maintenance, inspection and preparatory visits for the Linac4 connection.

The pepper pot of Linac3 will be removed and replaced by a blank pipe. 4 new stripper foils will be installed.



LEIR

D. Nicosia presented the activities scheduled in LEIR ([Annex10](#)).

They are mainly inspection and normal maintenance. 3 cables will be pulled in the ring for temperature monitoring.

R. Alemany commented that the intervention to check fast bumpers was not in the list yet.

PSB

D. Hay presented the activities scheduled in the PSB ([Annex11](#)).

EN/EL will proceed to general services powering tests. Exact time still needs to be defined with Operation. A wire scanner will be replaced in the ring and will require venting.

PS

F. Pedrosa presented the activities scheduled in the PS ([Annex12](#)).

The EN/EL powering tests were already mentioned above. A new foil will be installed in TT2 and will require venting. In the PS ring, intervention on the longitudinal damper cavity and installation and measurement of the 80 MHz fast tuner prototype will require 30 hours.

SPS

D. McFarlane presented the activities scheduled in the SPS ([Annex13](#)).

Cable will be pulled under the false floor in BA1. The MBB.30470 magnet will be replaced in BA3 (access from BA2). The line will be vented in BA3 for the replacement of QD 30301 and MBA 33201. Activities requested by EN/STI for the installations in BA5 were not approved by the vacuum group. **C. Pasquino** confirmed that the vacuum team was short in resources.

As usual, the lift maintenance schedule was given.

4. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.5).

Dedicated MD this Wednesday affecting everybody excepted ISOLDE from 8:00 until 18:00. Next week the LHC MD will take place. Tomorrow during the MD a stop of 5 mins around 11:00 was approved to reload the FGC_63 class.

5. AOB

There was no AOB.



Next Meeting: Tuesday 12th June 2018.

Minutes reported by [J.B. Lallement](#) on 7th June.



Summary of the 16th FOM Meeting

Held on Tuesday 12th June 2018

Agenda <https://indico.cern.ch/event/735859/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *ITS1 activities*
4. *Schedule update*
5. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 15th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

R. Scrivens reported the status of the linacs ([Annex 1](#)).

Linac2 had a pretty good week. On Thursday, the LT.BHZ30 power converter had to be switched to the spare (3.5 h downtime). The original one will be repaired during the technical stop. The current fourchette for the interlocks still needs adjustments and will be tested today.

The Linac3 oven1 was refilled on Thursday. From Friday to Sunday, some tests with N₂ gas injection into the source took place. N₂ gas injection (instead of O₂) should avoid the build-up of lead oxide at the oven, which is limiting the performances of the source. After two days of tests, too much Fe was seen in the beam and they went back to O₂. On Sunday a fault occurred on the source PLC. It was solved by a power cycle. An endoscopy will be performed in the LEBT area by the vacuum team during the next technical stop (profiting from the removal of the pepper pot).

LEIR

R. Alemany presented the status of LEIR ([Annex 2](#)).

It was a very short week for LEIR with the Linac3 oven refill and source MD. There were 2 main issues: with the ER.QFT24 power converter (fixed with part replacement) and with a false alarm on KFH, which was fixed by experts. The injection efficiency was improved (78% achieved).



PSB.

F. Antoniou reported on the PSB status ([Annex 3](#)).

It was a nice week for the PSB with 96.8% availability. The main downtime came from the issue with LT.BHZ30 power converter (as discussed earlier). The BTM.QNO05 magnet tripped and it needed a Piquet intervention (2h downtime). Due to a problem in the WR distribution in R4, all rings were switched back to the old B-train system. The problem is being followed up. Focus was given to the preparation of the LHC eCloud MD beams this week, with 18E10, 36E10, 60E10 and 72E10 p/ring. Several MD studies also took place in the PSB, focused on: MTE optimization, K-scan in BTM line, alternative working points in the PSB (Q4Q3 and Q3Q5 optics), optics studies at 160 MeV, new Transverse Feedback System, non-PPM fully matched optics from PSB to PS and tune scans.

ISOLDE

E. Matli reported the status of ISOLDE ([Annex 4](#)).

It has been a very good week at ISOLDE. HRS has been delivering Scandium all week to COLLAPS without major issues. There has been an intervention to replace the laser window in the separator area and a few interruptions of protons from the PSB.

The GPS target was changed on Friday and needed recalibration of the clamps. Basic set up of the separator to get some beam after the separator to allow the target group to make some mass scans took place during the weekend.

ISOLDE Users

K. Johnston added that the COLLAPS experiment was measuring hyperfine parameters of Sc isotopes. From an operations point of view the run was excellent, with acceptable yields and a stable machine. The experiment got off to a very good start and measured 46-49Sc quickly. At 50Sc impurities in the beam (Cr) meant that it was very difficult to separate the Sc and it took 4 days to get sufficient statistics. The run finished this morning and the team hope that they have enough data to complete their program.

PS

I. Efthymiopoulos reported the status of the PS ([Annex 5](#)).

It was a very good week for the PS with an overall availability of 96.9% and most of downtimes due to Linac2 and PSB. The few PS issues were due to problems with the SMH16 power supply, with controls and with RF trips. The PS provided beams to LHC (BCMS 48b beams, LHCINDIV), East Area Users (3.5 e12 ppp), AD (14.2 e12 ppp), nTOF (7.7 e12 ppp), and as of Friday morning to SPS-FT (16.2 e12 ppp). Work on the lead ion beam from LEIR was done during the week to provide a Pb81 beam to SPS using a new stripper foil in the TT2 line. A rich MD program with 12 activities was scheduled and completed during the week, including the dedicated one to study the PSB-to-PS beam transfer optics.



The integrated intensity delivered to nToF reached 35% of the 2018 run target (8.3% ahead of schedule).

East Area

B. Rae said it was a smooth week. The CLOUD experiment will start to take the beam this week, once the beam permit is fully signed.

East Area Users

H. Wilkens said that everything went fine except for the CHARM experiment, which got an issue with the target station.

nToF Users

D. Macina could not attend the meeting and sent the following information: *“On Wednesday morning we will ask to stop the beam for about 4 hours to do our calibrations. There might be other requests but for the time being they are still under discussion”.*

AD - ELENA

L. Bojtar reported the status of AD.

It was a good week. The only downtime came from a power supply that had to be replaced. The E-cooler performance was not recovered yet. **T. Eriksson** added that the target leak rate clearly depends on the beam intensity. It looks like there is an intensity threshold above which the leak opens up.

Concerning ELENA, **T. Eriksson** said they worked on improving the transfer from AD to ELENA and they reached a better deceleration efficiency. The E-cooler beam energy was successfully increased to 100 eV. They were facing some issues with the H⁻ ion source.

AD users

H. Wilkens said that, as feared, there were issues with the helium delivery.

SPS

V. Kain reported the status of the SPS ([Annex 6](#)).

Most of the week was dedicated to repair the MBE2103 converter and many MDs took place in parallel. The ZS4 showed vacuum degradation and the HV connector had to be removed and replaced by a pumping cloche (10 days would be required to exchange the ZS. Mainly because of cool down time). Scrubbing and high intensity LHC beam studies continued. LHC MD beams were prepared. The beam was delivered back to the fixed target experiments on Friday afternoon. A new stripper foil was tested for the lead ion beam giving a distribution of 3 different charge states (will have to decide on



which one to focus). Instabilities on operational LHC BCMS beams were investigated. Unfortunately, the BLMs did not trigger a beam dump and tests were interrupted (this issue is being followed up).

North Area

B. Rae confirmed they received beam from Friday afternoon. The faulty quadrupole in P42 was successfully replaced. There was an issue in H4 with the dump position as seen in their software, which is now fixed.

North Area Users

H. Wilkens said that experiments were happy to see the beam back. The COMPASS said the beam quality was as before the stop.

AWAKE

E. Gschwendtner could not attend the meeting and sent the following information: *"We are currently working on the electron beam system to optimize the electron beam parameters (emittance, focal point, etc...). We plan to start our next physics run on 2 July 2018 (week 27) and not on 25 June (week 26) as originally planned in the injector schedule."*

LHC

R. Steerenberg reported the status of the LHC.

Last week was very tough. An UFO induced the quench of 8 magnets and it took 15 hours to recover. The run went very smoothly from Friday night and 23fb^{-1} integrated luminosity were reached (5 fb^{-1} ahead of schedule). The LHC went into MD mode this morning. There is an issue with the cryogenic filter in point4, which is clogging. A regeneration of the filter could be possible, but would take 4-5 hours. The cryogenics team is doing its best to avoid that.

CLEAR

A. Curcio reported the status of CLEAR ([Annex7](#)).

There were no interventions nor major issue. CLEAR achieved a bunch length compression below 1 ps. The current plan is to do irradiation experiments for medical applications.

TI

R. Ledru reported on the Technical Infrastructure status.

Despite the many thunderstorms, there was no major issue impacting the machines.



3. ITS1 activities.

Linac2 & Linac3

JB. Lallement presented the activities scheduled for the next technical stop in Linac2 and Linac3 on behalf of **C. Mastrostefano** ([Annex8](#)).

There are only 2 new activities in comparison to the list presented last week: Maintenance of green space between bldg. 351-363, and as already discussed earlier, endoscopy in the Linac3 LEBT area.

B. Mikulec said that in order to perform the LT.BHZ20 tests, the Linac2 tunnel should be closed on Tuesday evening.

F. Pedrosa confirmed that the green space activities will take place on Tuesday.

LEIR

F. Pedrosa presented the activities scheduled in LEIR on behalf of **D. Nicosia** ([Annex9](#)).

There are only 2 new inspection activities (magnets and e-cooler inspections). Details on the IMPACT 114371 activity were given (3 cables will be pulled from the LEIR control room to the machine).

PSB

D. Hay presented the updated list of activities scheduled in the PSB ([Annex10](#)).

There are few additional activities. The wire scanner replacement could start from 10.00 on Tuesday. The general services powering tests will take place before the beam stop.

PS

F. Pedrosa presented the list of new activities scheduled in the PS ([Annex11](#)).

There is a request to test the LT.BHZ20 power converter. As there are no long activities in the Switchyard, they should all be completed by Tuesday evening and the area could be closed. **F. Pedrosa** will inform in case this would not be possible.

SPS

D. McFarlane presented the updated list of activities scheduled in the SPS ([Annex12](#)).

There are 30 new IMPACT activities (mainly inspections). In BA1, the pulling cable activity will take up to Wednesday noon. The main activity in BA3 will be the replacement of the MBB.30470 magnet (details were given). Given the number of activities in BA5 and BA6, there is a concern about the availability of access system keys. Because of a lack of resources, the vacuum team did not approve the BA5 activities 114604 and 114609). They will nevertheless help with the leak detections.

D. McFarlane added that, due to the fact that there are only 2 technical stops this year, there were many complains about the amount of work to be fitted into ITS1.



Upon a request of **C. Pasquino**, **D. McFarlane** confirmed that the lift maintenance schedule could be re-arranged.

UA9 & COLDEX runs, beam stop/start times around TS1

B. Mikulec presented the RP recommendations for the ITS1 ([Annex13](#)).

UA9 Run:

- 18/06 07:30: Stop SFTPRO; **start UA9 run**
- 18/06 16:00: **Stop ISOLDE/TOF/EAST/AD proton beams** – 16h cool-down
- 19/06 05:00: **Stop all proton beams (except COAST injection for UA9)** – 3h cool-down
- max. 10 COAST injections/hour later than 05:00 (~3h before the RP survey)
- 19/06 06:30: **EN-EL powering tests**
- 19/06 07:00: **Stop all ion beams and COAST injection for UA9** and **stop UA9 run** – 30min to 1h cool-down

ITS1:

- 19/06 **07:30 – 08:30**: Move storage of ACCCON and LASER Databases (InCA/LSA + CCDB + Elogbook + AFT + ASM + LASER) – **none of these controls DB will be available!** [IT-DB]
- 19/06 08:30 – 08:45: Reboot of GPN routers in ccc → no more communication to all connected GPN services
- 19/06 07:30: RP access to BA3
- 19/06 08:30: Access for SPS (if needed 8:00)
- 19/06 08:00: RP survey for PS complex
- 19/06 09:00: Access start for PS complex (except Linac2 and PSB)
- 19/06 10:00: Access start for Linac2 and PSB
- 20/06 08:30: Controls stable; restart machines (at least without beam) as soon as possible

COLDEX Run:

- 20/06 14:00: Start COLDEX run
- 21/06 13:00: Stop COLDEX run
- 21/06 13:30: Access for COLDEX
- 21/06 14:00: SPS ready for NA physics

The magnet team could access BA3 with RP during the survey at 7.30 (should be confirmed).

Linac2 will be closed on Tuesday evening (resulting in only 7 hours technical stop!) and first beam from 8.30 on Wednesday morning (at the earliest). On Tuesday morning, from 5.00, the beam stopper will be inserted in at the Linac2 and only opened if beam is needed for the UA9 COAST.



IT interventions

There are 2 interventions planned by IT next Tue 19th of June, both approved by TIOC:

1/ <https://asm.cern.ch/cc/1421412>: Move storage of ACCCON and LASER Databases (InCA/LSA + CCDB + ELogbook + AFT + ASM + LASER)

Resp: IT-DB

Start time (proposed): 7:30am

Duration: 1 hour

Impact: ALL controls DB will be shut down for about 1hour.

2/ <https://asm.cern.ch/cc/1418805>: Reboot of GPN routers in CCC.

Resp: IT-CS

Start time (proposed): right after 2/

Duration: 8-10 minutes

Impact: Communication lost to all connected GPN services. -> NO impact on videos of the access system.

The intervention on the database will take place from 7.30 to 8.30 on Tuesday morning. IT-DB should contact the CCC (PS island) before their intervention to confirm that all machines were already in standby mode (none of the controls DB available for 1 hour including the elogbooks).

The GPN routers intervention will have no impact on the access system. It will directly follow the first intervention.

4. Schedule update.

B. Mikulec presented the new version of the [injector schedule](#) (version 1.6). .

One day of the LHC MD2 block (Saturday) was moved to today and the SPS parallel MD was cancelled. The start of AWAKE was postponed by one week.

5. AOB

- The beam requests for LHC special runs were presented ([Annex14](#)). All beams should be ready by the end of next week.
- The maintenance of the access door YEA01.TT2=269 ([Annex15](#)) was approved.

Next Meeting: Tuesday 19th June 2018.

Minutes reported by [JB. Lallement](#) on 14th June.



Summary of the 17th FOM Meeting

Held on Tuesday 19th June 2018

Agenda <https://indico.cern.ch/event/737208/>

1. Follow up the last FOM

2. Schedule updates

3. AOB

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 16th FOM](#) were approved.

No follow-ups were reported.

Linac2 & Linac3

F. Di Lorenzo reported on the status of the linacs ([Annex 1](#)).

Linac2

Linac2 had a good week with 100% availability. On Tuesday, the power converter specialist replaced the interlock board of LT.BHZ30, putting the old interlock card into the spare converter.

B. Mikulec asked why this beam stop didn't show up in the Linac2 downtime.

G.P. Di Giovanni replied that the fault was not entered in the Linac2 elogbook and that he would make sure this happens.

Linac3

Linac3 had a good week with 99.8% availability.

LEIR

V. Kain reported on LEIR ([Annex 2](#)).

The NOMINAL cycle was set up from scratch last week, which took the whole week. The current and the following weeks were foreseen to increase the intensity to values, which are comparable to 2016 (LIU). The EARLY cycle was in good shape.

PSB

G. P. Di Giovanni reported on the PSB ([Annex 3](#)).



It was an average week for the PSB with 90% availability. The AUG alarm caused most of the downtime on Tuesday. The cause was an accidentally activated button. It took ~14.5 h to return to operation. The consequences of the event are listed in [Annex 3](#). Also, problems with the TOF beam were noticed, but not understood yet. The production of the TOF beam was moved from R2 to R3 until ITS1.

ISOLDE

J.A. Rodriguez reported on ISOLDE ([Annex 4](#)).

A good week was reported for ISOLDE. HRS had no significant issues other than postponed MEDICIS target irradiation due to problems at the PSB.

GPS sent Magnesium to LA1 (Thu-Mon) after setting-up and optimization. Some minor issues were reported. After the commissioning, REX/HIE-ISOLDE sent the highest energy per nucleon beam reached in the facility to the ISS experimental station. 19 cavities were working.

B. Mikulec asked if the full set of cavities was used.

J.A. Rodriguez answered that 19 out of 20 cavities were currently used. During the HW commissioning, it was found that the copper was not of good quality for one cavity and consequently not used. There is still a bit of margin in energy.

ISOLDE Users

K. Johnston sent a summary from the users side last week at ISOLDE:

A very good week in terms of operation and also physics. IS614 were measuring the decay properties – half life and branching ratio - of ^{22}Mg a nucleus which can be used to determine the unitary of the CKM matrix via superallowed beta decay. This is a challenging experiment as ^{22}Na – which is very easily produced at ISOLDE – has to be suppressed using a special ion source. This was the first time since 2012 that this ion source was used and it performed very well, no Na was seen at the experiment and the users are very satisfied: they should have enough statistics to determine the decay properties of ^{22}Mg to the desired precision.

PS

A. Guerrero Ollacarizqueta reported on the status of the PS ([Annex 5](#)).

The PS had an availability of 88% this week mainly due to the issue in the booster on Tuesday. Regarding the PS, two accesses on Tuesday and Friday for cavities C51 and C76 were needed, with 2 h and 1 h beam stop, respectively. Some time was also lost on several occasions due to an issue affecting the 10MHz cavity return sum signal thus all RF beam controls. More or less critical losses appeared and were cured without any intervention. Finally, the issue was traced back to a lemo with bad contact. This week it is also worth mentioning the change of injection ring for the TOF beam from R2 to R3 to relax the usage of R2 that is having an issue with the TFB. After the change, an error in the sequence program left nTOF with only the parasitic beam around 2h.

Operational beams together with LHC MD beams have been delivered as requested. The beams for the LHC 90m special run are now prepared: LHC 50ns and LHC100#18b and 12b.

East Area

B. Rae said that there was nothing special to report. The CLOUD experiment started on Friday.



East Area Users

H. Wilkens reported on the status of the East Area Users.

The number of cycles was increased to the north branch for the CLOUD experiment.

nToF

There was nothing special to report.

AD-ELENA

AD

P. Freyermuth reported on the status of AD and ELENA ([Annex 7](#)).

The AD performance was shadowed by the booster problems in the first half of the week. After bad shots and strange signals of the magnetic horn, the beam was turned off in the second half of the week. Signs of a short-circuit were found. Investigations are ongoing along the power path and target area.

ELENA

ELENA had a good week.

A circulating beam was decelerated to the lowest energy of ELENA for the first time. To achieve this, a new transfer optic was made. Work on the RF and coupling corrections was ongoing. The first measurements with the SEM grids were done.

F.-X. Nuiry added that the EN-STI team was investigating on site. They check the cables, the strip line etc. to understand the flash-over, which occurs every 20 pulses.

AD/ELENA Users

There was no report from the AD/ELENA users.

SPS

F. Velotti reported on the status of the SPS ([Annex 8](#)).

The SPS is back to normal operation with an availability of 83%. The main problems in the SPS were a trigger module MKDH issue and a sequence manager - telegram issue. It is still not understood completely. The NA physics is back since Friday 8th of June. LHC MDs characterized the week. Frequent SC variations perturbed the spill quality. The ZS4 vacuum was always under control, and the spark activity has got a new SIS interlock. The beams requested by the LHC MDs were delivered as expected. The 100 ns and 50 ns beam for LHC special runs were taken. The LHC ion beam is under preparation and at the moment accelerated up to FT.

H. Vincke asked if the ZS4 was still not running.

F. Velotti answered that ZS4 was not running and the slow extraction was done without the septum.

It was asked if the new bump had already been installed.

F. Velotti answered affirmatively.



North Area

B. Rae reported on the North Area.

Nothing special to report.

North Area Users

H. Wilkens reported on the North Area Users.

NA62 was complaining about the spill structure. There were large spikes at the beginning of the spills on Friday due to the ongoing LHC MD.

AWAKE

There was no report on AWAKE.

CLEAR

There was no report on CLEAR.

LHC

E. Bravin reported on the status of the LHC.

There was the MD week for LHC. Now, the beam has to be re-established, and the machine has to be revalidated. This will be followed by the VdM scan and the high beta run. On Tuesday, the VdM cycles should be started. The details were presented at the last FOM ([Annex 9](#)).

B. Mikulec asked about the parameters for the Calibration Transfer Fill. The intensity was $1.2e11$ ppb and the emittance was $2-3\mu\text{m}$.

E. Bravin replied that these parameters were for stable beams and not at injection, probably a standard LHCINDIV beam.

To be followed up.

TI

J. Nielsen reported for TI ([Annex 10](#)).

The AUG alert on Tuesday could not be tracked down. Several companies were working nearby at the same time. EDF confirmed an electric perturbation on Thursday. A small water leak (a ruptured pipe) in EHN1 on Thursday was reported.

2. Schedule updates

B. Mikulec presented the injector schedule ([version 1.6](#)).

This week (25) was the technical stop for the injectors and the LHC.

An EN-EL summary was sent by **J. Devine**:

Here's a short EL summary of the results from our tests this morning in 355 and 361:

*355 – We cut the power to EBD20*6 at 6:30 AM as planned. I understand there was an issue with the beam in the PS due to a trip on an injection kicker. It remains to be established if the two events are*



related. The test was repeated at 6:44 AM, but it is my understanding that beam had not been restored to the PS. I would welcome any input from BE/OP that might clarify the timings and events observed.

*361 – Power cuts to EBD16*25A and EBD17*25A were executed at 6:45 and I understand they passed off without incident.*

The test in 151 at 8AM was also successful. We confirmed that all equipment supplies in 151-R-011 (200Mhz equipment) are currently powered from the general services network, along with a star point (single supply) that serves all the RF equipment in R-011 and R-005. We will look at moving these over to the machine network and dual supplies (UPS) for the star point. However, the supply for the lighting in 151 was only partially identified, we will conduct some more localised investigation into this later on today.

*Work on ESD1*25/ESD2*25 is ongoing and the switchboard will be re-energised as soon as possible.*

It should be clarified if the 355 tests have to be repeated..

B. Mikulec said that the IT interventions were still carrying on. There will be a follow up on this.

Beam officially should be back around midday (June, 20th), followed by the COLDEX run in the SPS.

3. AOB

There were no AOBs.

Minutes reported by [S. Hirlander](#) on 22nd June.



Summary of the 18th FOM Meeting

Held on Tuesday 26th June 2018

Agenda <https://indico.cern.ch/event/739330/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *ITS1 report*
4. *Schedule update*
5. *AOB*

1. Follow-up of the last FOM

R. Alemany chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 17th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

R. Wegner reported the status of the linacs ([Annex 1](#)).

Linac2 had a good week with 3 interruptions due to the technical stop, an upgrade/reboot of the central timing and a short amplifier trip yesterday morning. During the Technical Stop the Hydrogen bottle was replaced, the HV column was cleaned, the source water cooling, tank distance and cooling flow were checked. Tests were performed on the RBHZ20 and BHZ30 power supplies.

Linac3 ran pretty well. During the Technical Stop the oven was re-filled, 8 new stripper foils were installed, the pepper-pot emittance meter was removed, the spectrometer vacuum chamber was checked and an RF tube on tank 3 exchanged. The beam was back on 20 June in the morning. However LEIR had trouble in capturing the beam. The phase of tank 3 was found wrong after the tube exchange. This was caused by a problem with the control PLC and a LLRF card that did not recover the reference phase.

E. Mahner added that it was too early to conclude on benefits of the pepper pot removal.

LEIR

R. Alemany presented the status of LEIR ([Annex 2](#)).



It was a very difficult week for LEIR. After the Linac3 tank3 tube exchange, the beam energy from the linac changed considerably. LEIR was restarted on Thursday and reached only 50% injection efficiency. On Friday, the Linac3 and RF team re-adjusted the RF settings and a good transmission was recovered in the transfer line, but with a very limited effect on the injection efficiency. Yesterday morning, a Brho scan showed that by decreasing Brho by 1 per-mill, the injection efficiency of 60-70% was automatically recovered. In parallel, the L3 team performed a tank3 phase scan and the nominal injection efficiency was recovered. The decrease of Brho by 1 per-mill is not understood yet. This issue illustrates the need of the migration to a new LLRF system with more diagnostics.

PSB.

A. Findlay reported on the PSB status ([Annex 3](#)).

It was a good week for the PSB, dominated by the Technical Stop. The electricity distribution test for the PSB building was carried out early Tuesday morning, and no problems for the machine operation with beam were observed. However, the principal PSB access point YEA.01=PSB was on the circuit that was cut, it remained functional until the UPS ran out of power, then this went down, making access impossible and losing the PSB patrol. The issue seems to have been understood and a solution is being discussed. The wire scanner intervention went well, with vacuum declaring the PSB vacuum good for beam by 17H40. All the other interventions took place without incident and the PSB was patrolled by 19H45 on Tuesday evening. A number of issues were identified overnight and the appropriate specialists called the following morning to solve them. By 11H00 on Wednesday there was high intensity beam back on 3 out of the 4 rings, with the other ring following soon after, once the commissioning of the new Q-Strip hierarchy with the new FGC convertor for BR1.QCF was completed.

A problem with the low intensity LHC beams stopped the beams from being correctly injected into the machine, despite the high intensity ISOLDE beam being injected without problems. Thankfully there were several PSB machine supervisors in the CCC at the time, and they identified that the problem came from the timing cascade used to trigger the distributor plus an interlock problem, so once this was corrected and beam requested in R4, the timing distribution for the distributor returned to normal for all rings. The issue with the R2 TFB was identified as a broken pre-driver which was replaced. A connector that had an intermittent bad contact was also identified and repaired. The new FGC convertor for BR1.QCF is working well, although the sampler has yet to be updated, but is underway. The White Rabbit B Train distribution reliability run re-started after the successful replacement of a LL card in R4. The new HW for the TFB was installed, initial cabling done and FESA classes installed, another step forward in the commissioning of these systems.

ISOLDE

S. Mataguez reported the status of ISOLDE ([Annex 4](#)).

It was a very good week at ISOLDE.

On GPS, a new target was installed on Tuesday morning and a stable beam was delivered for REX trap tests (BE/ABP MD). Another new target was installed on Thursday morning and the set-up was done on Friday. The RILIS lasers were tuned on Friday afternoon. Medical isotopes were produced for GLM/GHM on Saturday. Yesterday, IDS took some shots on Dy.



On HRS, tests are on-going to solve the issue with the RFQ (cooler/buncher). They started last week and should last one more week.

On HIE-ISOLDE, all 19 super conducting RF cavities were phased to deliver 96Kr/212Rn to Miniball IS644 on week28.

ISOLDE Users

K. Johnston could not attend the meeting and sent the following information: *"From the users side: during the technical stop some tests were carried out at REX trap on GPS until Thursday morning. Then preparations began for the collection of medical isotopes on the GPS which continued over the weekend. Since Sunday evening collections of 149Tb (for alpha therapy) which is shipped to PSI every morning. In addition 152Tb and 155Tb (for medical diagnosis/imaging) is being collected for shipment to PSI, NPL (UK) and Helsinki. So far the beam looks good but too soon to say if the chemical separation required for the experiments is yet working well."*

PS

D. Cotte reported the status of the PS ([Annex 5](#)).

It was a not a perfect week at the PS with an availability of 88%. On Monday, a communication issue with the 1553 bus perturbed the East Area beam production. A similar issue also affected the restart after the technical stop and the beams were back at 20.00 on Wednesday evening instead of 14.00 in the afternoon. The reason of this issue could be the temperature inside the building where the electronic cards are installed. There were frequent trips of POPS and PFWs until Friday, when the previous version of the PFW software was re-installed. Operation is smooth since then. There were also a few issues with the C10 cavity. The relay gap had to be replaced. All beams requested for the LHC special run are available.

A vacuum window was found broken on the transfer line to the East Area. A sector up to 20 meters long was vented. Since the vacuum window was replaced, the RP monitor PAXP502 readings went back to normal values. Unfortunately, the new window broke this morning and an access should be given to the PS ring for the intervention. It should be planned sometime next week when the vacuum team will have determined the new type of window to be installed.

The nToF delivered integrated intensity is ahead of schedule (up to 40.3% of the annual commitment already delivered).

Concerning the vacuum window issue, **R. Froeschl** commented that the residual dose rate measured during the TS all along the line is pretty high. **I Eftymiopoulos** added that the access should be done once the LHC will be back in normal operation with long fills.

After the meeting, **L. Soby** reported on the following issue: Some CERN colleagues did not receive a notification when their access rights to the got suspended. Indeed, the PS permission is marked as not sending notifications to the persons (no warnings about requests/courses, no notifications when access is lost). This matter will be followed-up by **F. Perdrosa**.



East Area

B. Rae said that besides the broken window issue, they still had a problem with the beam stopper control affecting all the East Area beam lines. If nothing is found by tomorrow, they will have to change the software. **B. Rae** is personally following up this issue.

East Area Users

There was no report.

nToF

F. Harden reported that they will change the experiment next week. The nToF team will then contact the PS team to adjust the timing, as the delay will have to be reduced.

AD - ELENA

B. Lefort reported the status of AD ([Annex6](#)).

On the previous Friday, the magnetic horn used to focus Pbars after the production target tripped. Varying pulse shapes as well as HV flashovers at the power supply and at the connection at the exit of the junction box were observed. The junction box into the AD target had to be replaced and the operation was very smooth since then.

Concerning ELENA, **T. Eriksson** said that due to the AD issue, they only used H⁻ ions. They are focusing on the E-cooler setting-up and still need a week to fully commission it. A first H⁻ beam was extracted to the GBAR experiment.

AD users

There was no report.

SPS

K. Cornelis reported the status of the SPS on behalf of **V. Kain** ([Annex 7](#)).

On Monday the beams were stopped at 7h30 to start the UA9 run. The UA9 run was suffering from orbit spikes every so often coming from the dying magnet in 304. Nevertheless, a large amount of data could be collected. Tuesday to Wednesday 12h00 was dedicated to TS1. The FBCT519 with the radiation hotspot was found to be misaligned by 12 mm in H and 5 mm in V. The faulty magnet in half cell 304 was MBB.30490, which was exchanged. Aperture measurements will be required to see the effect of the potential aperture improvements at several locations in sextant 3. The SPS was ready to receive beam for COLDEX on Wednesday at 15.00). Unfortunately, no beam was available from the PS until 20.30 (synchronization problems with PS injection bumpers). COLDEX took finally beam from Wednesday evening until Thursday 12h30 with up to 288 bunches. Beam was back for fixed target on Thursday afternoon. All in all the start-up after the TS1 was fairly smooth in the SPS. The weekend was then dedicated to physics production for the North Area and the preparation of all the beams required for the special runs in the LHC coming week. Due to recent issues, the fixed target delivered integrated intensity is below schedule, but the present trend is encouraging.



L. Soby commented that it is specified in the ECR that the BCT519 should be aligned. Something went wrong in the communication between different teams and BI is following this up.

North Area

B. Rae said there was no problem to report.

North Area Users

There was no report.

AWAKE

E. Gschwendtner said that they will start the run on next Monday and it should last for 2 weeks.

CLEAR

A. Curcio reported the status of CLEAR ([Annex8](#)).

There were no major issues nor interventions. THz radiation studies are on-going.

HiRadMat

M. Barbagallo said they were working on the optimization of the HiRadMat beam with respect to the ZS limitations.

LHC

There was no report.

TI

J. Nielsen could not attend the meeting. Details on the last week events are available at: <https://wikis.cern.ch/display/TIOP/2018/06/19/TI+Summary+Week+25>

3. ITS1 reports.

Linac2 & Linac3

C. Mastrostefano reported on the ITS1 activities ([Annex9](#)).

Linac2 access started at 10.30 on Tuesday morning and the machine was closed at 17.00 in the afternoon. All planned interventions took place without any issue.



The Linac3 endoscopy was inconclusive. 8 new stripping foils were installed.

LEIR

R. Alemany reported on ITS1 activities in LEIR on behalf of **D. Nicosia** ([Annex10](#)).

All the activities took place. The fast injection bumper regulation was adjusted. 3 cables were pulled for environmental temperature monitoring. Solenoids were installed on 5 BPMs in the ETL transfer line.

SPS

D. McFarlane reported on ITS1 activities in the SPS ([Annex11](#)).

There was a total of 121 IMPACTS. The accesses started at 8.30 on Tuesday morning and the machine was closed at 12.00 on Wednesday. The vacuum team completed the activities related to VTSA_30301, MBA_30490, VTTC_33201 and XRPH_51937. A short circuit was found on MBB.30490, which was replaced by a spare. 6 water leaks were found and fixed on magnets during inspection. EN-EL completing all cabling requests except one (issue with lockout procedure). Some feedback was given on the Crab Cavity works.

As general comments:

- Every SPS single point had a forced door (with exception of BA1). It required patrolling all the SPS, which took 5 hours.
- There were multiple reports of people not wearing the correct Personal Safety Equipment to access the PS.

4. Schedule update.

R. Alemany presented the [injector schedule](#) (version 1.6).

5. AOB

There was no AOB.

Next Meeting: Tuesday 3rd July 2018.

Minutes reported by [JB. Lallement](#) on 28th June.



Summary of the 19th FOM Meeting

Held on Tuesday 3rd July 2018

Agenda <https://indico.cern.ch/event/740738/>

1. Follow up the last FOM
2. Schedule updates
3. ITS1 debriefing (PSB & PS)
4. AOB

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 18th FOM](#) were approved.

No follow-ups were reported.

Linac2 & Linac3

R. Scrivens reported on the linacs ([Annex 1](#)).

Linac2

No faults were reported for Linac2. The Linac2 interlock system was blocking the beam to the LBE line, and an investigation is needed with an expert next week (week 28).

Linac3

The energy was made suitable for LEIR on Tuesday (26th June) morning. On Wednesday (27th June), on the RFQ amplifier, the measurement of the filament heating failed in a way that looked like an impending tube failure. The fault was tracked to failed measurement circuit rectifiers (both the original and the spare failed after a few hours). Due to the complexity, it took more than one day to debug and repair. Thanks to the RF team who worked two evenings to recover.

An oven refill is scheduled for Thursday (4th July).

LEIR

M. E. Angoletta reported on LEIR ([Annex 2](#)).

On Wednesday (27th June) the EARLY beam was sent to SPS (MD3684: setting up of the cycle for partially stripped Pb ions with acceleration). In addition, the setup of "LIU-intensity" NOMINAL cycle was done. On Friday (29th June) the EARLY was sent to SPS (MD3393: LLRF setup) and Ecooler problems made the EARLY cycle unreliable, which has been solved on Monday (1st July). The



NOMINAL-type beam with small emittance (~ 6 eV/s) was successfully sent to PS for the LLRF setup (no splitting).

E. Mahner wanted to know how high the Linac3 current was when the LIU intensity was reached for the Nominal cycle last week. When the LIU intensity was reached in 2016 the Linac3 current was about 35 μ A, which was not reached in 2018. This would mean that the LIU parameters could be reached with a lower intensity.

H. Bartosik replied that the current from Linac3 last week was around 30 μ A but it has to be checked. However, he pointed out that the Linac3 current is not the only relevant parameter for reaching high intensity in LEIR.

PSB

J.F. Comblin reported on the PSB ([Annex 3](#)).

This was a good week for the PSB with an availability of 98.7%. Most of the downtimes came from several trips of an ejection bumper that started Saturday evening. The problem was finally fixed Sunday morning by the specialist. Otherwise, there were a few minor faults that just required a remote reset. Our attention was given to the beams needed for the LHC special run of this week, as well as setting-up of beams for future MDs. As usual, there were also several PSB MDs: Optic measurements, tune scans, studies on transverse feedback, Finemet cavity setup. For the latter, it is worth mentioning that an intensity of $1.1E13$ on ring 4 has been reached and this will be useful for other planned MDs.

ISOLDE

M. Lozano Benito reported on ISOLDE.

It was an excellent week for ISOLDE. On HRS there were some MDs for the RFQ. GPS had been running continuously for collections of different Dy (Dysprosium) isotopes using the GLM/GHM lines for biomedical research. Some short collections of Sc (Scandium) and Gd (Gadolinium) when time permitted. Collections at GPS will stop on Monday. Whenever possible and the central beamline was free to send GPS beam to the tape station some RILIS laser ionization tests on the Dy scheme for IDS were carried out by the RILIS team. At HRS RFQ (ISCOOL) an MD was done the whole week by the EN-STI team. It will finish Monday morning with a target change.

ISOLDE Users

K. Johnston reported for the ISOLDE Users:

Last week experiment IS528 was producing isotopes for medical studies for a variety of institutes: NPL (UK), Helsinki and PSI (the principal user). Collections ran through the week and shipments were made every morning until yesterday. For PSI this was the conclusion of a study on ^{149}Tb , which is an alpha emitting isotope for therapy. From ISOLDE the beam was excellent and the shipping logistics went very well, at PSI there were initially problems with the chemistry and labelling, but these were overcome by Wednesday and in the end excellent labelling was achieved. Time is needed before the results emerge, but it looks very promising.

PS

I. Efthymiopoulos reported on the status of the PS ([Annex 4](#)).



A good week for PS with only about 2h down-time due to extraction kickers and RF faults was reported. The PS delivered beam to all destinations: LHC (standard physics and special beams for the VdM scans), SPS Fixed Target beams (15e12 ppp), East Area (4.5e12 ppp), AD (14.0e12 ppp) and nTOF (7.4e12 ppp). The key issue for the week was the loss of a vacuum window in the PS extraction line to the East Area discovered after the restart from TS1 last week, leaving about 16 m for the beam passing through air. It could explain the increased radiation levels observed in the area (PAXR502) since the beginning of the year. As the initial window was in a non-easily accessible area a new window was placed in a location upstream in the line, thus recovering most of the vacuum. For this repair a Mylar window of 175 μm thickness was used (compared to 220 μm of the original one). With the new window the situation for the radiation levels was improved significantly, as well as the beam quality for IRRAD improved up to last year's levels. Unfortunately, the new window did not last long, and on Wednesday (27th June) morning it broke again, probably due to increased temperature. A new repair was done this time using a 250 μm Mylar thick window. Again, the beam quality improved, but since Sunday (1st July) evening the readings in the RP monitor (PAXR502) seemed to increase again. That indicates the window is broken again and the vacuum was lost in the sector. The EA team was investigating other options (Al window) that should probably be installed at the earliest occasion. For LS2 a solution to remove these windows and connect all into continuous vacuum should be investigated.

On the MD side, seven sessions have been scheduled and took data during the week, plus the test of the Pb-ion beam from LEIR to investigate the Pb80+, and Pb81+ beams to SPS was done. A new tune of the TT2 line for the new location of the ion stripper was prepared and successfully used.

East Area

L. Gatignon reported on the East Area.

The loss of a vacuum window in the PS extraction line was a problem. Despite of that the run was smooth. Two magnets were installed in the T9 user zone.

Later during the meeting, **L. Gatignon** commented on the vacuum window in the East Area. He received the information during the meeting that the vacuum window was not broken, but degraded. The window was replaced.

East Area Users

H. Wilkens reported on the status of the East Area Users.

CLOUD had a problem at the compressor, which was cooling the big chamber. The repair is ongoing and will be continued next Monday (9th July).

nToF

D. Macina reported on nTof.

It was a good week for nTof.

AD-ELENA

AD



B. Dupuy reported on the status of AD and ELENA ([Annex 5](#)).

AD did not encounter any major problem; the total yield of the machine was not at maximum. The next machine development period scheduled Monday (9th July) between 7h to 15h could improve a little bit this yield.

On Wednesday (27th June) due to the target water leak the intensity on target was limited to 1.25E13 on FTA.BCT9053 instead of 1.4E13. On Thursday (28th July) (4h48 – 7h06) a 5 kW electric cooler collector power supply was in fault. One fan air filter was blocked. Because the power supply module was located in a Faraday cage, two people were required (additionally the weight of one module was near to 30 kg and there were five modules...). On Sunday (1st July) (between 16h -22h there was a total beam interruption). Many interlocks of the HORN caused the problem and their reset takes up to 15 minutes. The specialist Viliam Senaj diagnosed an over temperature interlock. Several resets have been done on DR.QUAD and on the DR.SMI5306 injection septum from the CCC by the PS team. The target water leak became more severe week after week and several teams (TI, CV) realized the tank filling.

[ELENA](#)

ELENA had a good week. Details can be found in ([Annex 5](#)).

[AD/ELENA Users](#)

H. Wilkens reported on the users.

The BASE experiment will be running for three weeks from next month (August) on.

[SPS](#)

H. Bartosik reported on the status of the SPS ([Annex 6](#)).

It was a very good week for the SPS with high beam availability (> 94%) and only minor faults in the SPS itself. To mention is the MBB2404 power converter, which could not be restarted on Wednesday (27th June) after the dedicated MD and required an intervention of the piquet. On Friday, the RADMON in H6 gave some false radiation alarms, as there were no alarms in RAMSES. The expert identified that some modules were not working correctly. The beam for the North Area was running stably. Since this week the change of the spill structure, which was caused by the change of super cycle between physics production and LHC filling, was efficiently corrected by an offset in the tune function of 5e-3. This improved the spill quality especially in conditions with frequency super cycle changes. The LHC requested a variety of beams for various special runs and their preparation, including also fills for VdM scans, interleaved with intensity ramp-up on physics fills. From the SPS side this went rather smooth, apart from some issues with enhanced losses in the transfer line with the BCMS beam encountered Wednesday night/Thursday morning (27th/28th June). A high satellite population was observed in the LHC. At the same time, enhanced losses were observed in the LHC itself. Investigations are still ongoing.

The dedicated MD on Wednesday was devoted to partially stripped ions. Both Pb80+ and Pb81+ could be successfully injected into the SPS after deploying special transfer line optics to accommodate the different charge states after the stripper. The MD was quite successful and the lifetime of the two beams could be measured on an intermediate flat top (lifetimes of about 200 s for Pb80+ and about 600 s for Pb81+). This was an important milestone in view of the gamma factory proposal. The long MD on Thursday was devoted to high intensity BCMS studies (up to 2e11 p/b) and four batches. Still



there is quite some emittance growth on the 20s flat bottom. To be mentioned that there was no increased sparking observed on the ZS extraction septa, which is good news for future parallel MDs.

On Friday (29th June), the setting up of Pb82 for the physics run at the end of the year was continued. The RF voltage on the accelerating cycle had to be reduced in order to avoid tripping cavity 2. Aperture measurements to assess the impact of the TS1 interventions were performed on Saturday (30th June) for the vertical plane. The data analysis was ongoing. There was a BLM issue which stopped the beam for the North Area at 6h00 (3rd July). The problem was resolved, but can only be tested when PS sends beam (after the meeting). If this test fails, there might be a more severe hardware problem.

North Area

B. Rae reported on the North Area.

There was nothing special to report.

North Area Users

H. Wilkens reported on the North Area Users.

The users were happy. NA62 reported some minor issues. COMPASS asked to achieve 130 units on the targets.

AWAKE

E. Gschwendtner reported on AWAKE.

The beam permit was received on Monday (2nd July) evening. The proton run will continue till next week (week 28). The first days the focus will be the electron beam line to resolve some issues on the BPMs monitors. Another issue concerning the quadrupoles located at the end, which were disturbing the trajectory of the electrons 35 meters up the line at the source of the electrons, was reported. Investigations were ongoing.

CLEAR

A. Curcio reported on CLEAR ([Annex 7](#)).

There will be a one month technical stop for a redeposition of the cathode surface and for powering the X-band structure (the CLIC module).

LHC

There was no report from the LHC.

TI

J. Nielsen reported for TI.

There was nothing special to report.

2. ITS1 debriefing (PSB & PS)

PSB

D. Hay reported on the ITS1 debriefing for PSB ([Annex 8](#)).



The summary can be found in ([Annex 8](#)). No major problems were reported.

PS

F. Pedrosa reported on the ITS1 debriefing for PSB ([Annex 9](#)).

Some perturbations on the access system blocked the team for 0.5h. The work could still be done in time thanks to the efforts of all participating teams.

After the EN-EL general services powering test just before the start of ITS1, some modifications are needed for the 200 MHz cavity powering in b151.

For the green spaces issues with potential cable damage have been identified and should be followed up.

The list of the activities and some other minor issues can be found in ([Annex 9](#)).

It was emphasized that *all tests during Technical Stops must be announced to the facility coordinators beforehand and the necessary mitigation measures put in place by those performing the tests.*

3. Schedule updates

B. Mikulec presented the injector schedule ([version 1.6](#)).

H. Bartosik mentioned that there will be no beam sent to the North Area during the MDs.

4. AOB

There was the maintenance of access point YEA01.PSB=361 from 4th July 08h30 till 5th July 17h00 announced and approved ([Annex 10](#)).

Minutes reported by [S. Hirlander](#) on 4th July.



Summary of the 20th FOM Meeting

Held on Tuesday 10th July 2018

Agenda <https://indico.cern.ch/event/742513/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Schedule update*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 19th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

G. Bellodi reported the status of the linacs ([Annex 1](#)).

Linac2 has been running well all week, except for the electrical glitch on Thursday morning, which brought it down for a few hours. The LLSN01 solenoid power converter needed a piquet intervention to be restarted and the LT.BHZ20 FGC magnet was found to have lost its settings, thus blocking operation. Beam was back mid-morning after the two problems were fixed. The overall beam availability for this week was 97.8%.

Linac3 had also quite a nice week. Due to a couple of overnight power glitches, the source had to be restarted in the morning on a couple of occasions, but good beam intensity and stability was recovered soon after. An oven refill took place on Thursday as scheduled, and the restart was particularly swift. The source however went off on Sunday morning because of a broken filament in oven1, and operation was resumed with the second oven. The next refill is scheduled on July 19th.

R. Steerenberg asked whether the issue with the FGCs losing the settings was understood. **B. Mikulec** answered that it only concerns the FGC in 63 class and that an EPC controls issue has been created that is being followed up.

LEIR

N. Biancacci presented the status of LEIR ([Annex 2](#)).



It was a very good week for LEIR. Excluding the downtimes due to Linac3, the LEIR availability was 99% over the last week. The card controlling the ETL.BHN10 magnet was replaced and the current fluctuations seem now uncorrelated to temperature variations. The LEIR team optimized the AMDRF cycle throughout the week and reached a record intensity thanks to an improved injection efficiency on Friday with 10.35×10^{10} charges at the flat top (with only 30 uA from Linac3).

PSB.

B. Mikulec reported on the PSB status ([Annex 3](#)).

It was a pretty bad week for the PSB with an availability of 85.8%. Practically the whole downtime could be attributed to problems with the extraction bumpers BE.BSW14L4. There were already a few trips the previous weekend and it went down on Tuesday evening, stopping operation until Wednesday morning and there were few other trips during the week. The final diagnostics was that the fault was located in the three-phases connector from the EN-EL switchboard, which is powering the generator. There was one bad connection on the R phase in the connector powering the PCU. The problem was fixed yesterday during a beam stop and the total downtime was approximately 12.5 hours.

There were few other faults during the week. On Monday a circuit breaker EOD111*25A related to the WIC interlock rack RA353 tripped with a temperature fault, which as consequence tripped the MPS. The MPE specialist cleared the fault and beam was back 40 minutes later. There were several power glitches during Monday and Wednesday night leading to an accumulated downtime of <1h. Another glitch on Thursday morning took 2.5h for the PSB to return to normal operation (several piquet interventions). The BLM in section 5 (superior) was repaired yesterday. It was also found that the intervention during ITS1 for the last BPM before the dump was unsuccessful. On Thursday evening, a radiation alarm after a few vacuum pumps had stopped, led to an interlock of the PSB extraction and recombination septa. At the same time BT.BHZ10 tripped, and the piquet had to replace the IGBT (4h downtime). On Sunday there were a few trips of the extraction kickers due to bad synchronisation received from the PS.

Despite all these issues, there was very good progress with several machine studies.

ISOLDE

M. Lozano reported the status of ISOLDE ([Annex 4](#)).

It was a busy week at ISOLDE with some issues caused by the storms and the downtimes from the Booster. There were two interventions on the HRS separator that took a total of 12 hours. LA1 and IDS took different Bi isotopes from HRS.

GPS was on standby during the week and a new target was installed on Thursday for the first HIE-ISOLDE run that will start tomorrow.

ISOLDE Users

K. Johnston could not attend the meeting and sent the following information: *"There were two runs on Bi at the ISOLDE decay station with a new setup taking Fr and Ac beams in between. For the decay*



station, fast timing of $^{214}\text{Bi}/^{216}$ and ^{218}Bi went very well: the main issue being the interruptions of protons due to the storms. The yields were higher than expected which meant that the experiment wasn't affected by the less than planned time. On Friday IS637 started with measurements of Fr/Ra and Ac beams – studying the production of these isotopes for medical applications – which ran until Sunday morning. Then in-source spectroscopy on Bi isotopes resumed on Sunday and this finishes this morning. All in all, it has been a good week at ISOLDE. Now we are preparing for the first HIE-ISOLDE run of 2018 which is due to start by the end of this week”.

PS

F. Tecker reported the status of the PS ([Annex 5](#)).

It was not such a good week at the PS with a beam availability around 82%, mainly due to injector's issues. The radiation level on RP monitor (PAXP502) had increased again since Sunday evening, it was presumed that the vacuum window in the East line that had recently been changed was broken again. An access on Tuesday morning revealed that the window was not ruptured, but had two hot spots. It was replaced anyway with a 175 μm Mylar window, after a first 100 μm aluminium window broke from the vacuum pressure. The radiation level went clearly down again after the change. This caused 1:45 downtime for all beams plus 0:30 for the East Area. Power glitches on Thursday caused problems on cooling circuits that interlocked power converters in FTN and SMH57 causing 5:30 downtime. An OASIS crate power supply in cfi-353-cpaos6 tripped the electrical distribution and caused that many RF crates lost power, resulting in 3:30 downtime.

There were nevertheless good progresses on the PS MD side, and various MD beams were prepared for the SPS (High Intensity BCMS, 50ns with 12, 18 and 36 bunches, a 16-bunch beam for HiRadMat).

The nToF integrated delivered intensity is on good track with 10% above the schedule.

East Area

B. Rae said that it was a good week despite the broken window. A titanium vacuum window is ready for installation in case needed. The CLOUD experiment has completed their run.

East Area Users

H. Wilkens said that the irradiation facility is having tests on a DC –DC converter that will be used by CMS after the LHC upgrade. He confirmed that the CLOUD run was completed and the nominal intensity can be resumed.

nToF

D. Macina thanked the PS team for the delivered intensity.

AD - ELENA

P. Freyermuth reported the status of AD ([Annex6](#)).



The AD downtime was dominated by electrical glitches that principally impacted the AD injectors. For what concerned the AD itself, the First-line was called on Thursday and Friday to fix a broken power-supply. There was no sign anymore of the water leak on the target.

Concerning ELENA, **T. Eriksson** said that they started to observe signs of E-cooling at the flat-top, but work is progressing pretty slowly. There are fluctuations on the beam position coming from the H-source. A BPM.432 polarity inversion was found and they are experiencing issues with the Tomoscope.

B. Mikulec asked what was missing in view of the 1st ELENA run. **T. Eriksson** answered that the beam losses were still pretty high. The first beam to the GBAR experiment is still scheduled for July 30th.

AD users

H. Wilkens said there was nothing special to report.

SPS

K. Cornelis reported the status of the SPS ([Annex 7](#)).

It was a very bad week for the North Area beam production with many different issues related to: The splitter BLM (27 hours downtime), the data bus NA power convertors (16 hours), the thunderstorms (4 hours), the injectors (5 hours), the ZS (3 hours) and the RF controls (3 hours).

For the splitter BLM issue: On Tuesday morning a short on the high voltage line to the detectors was found. The HV generator was changed, but it also tripped. After some time the short disappeared by itself. On Thursday evening the same problem re-occurred. The decision was taken to let TT20 cool down for an access on Friday. On Friday morning a radiation survey was organized with a robot in view of a possible intervention to localize the short. During the access preparation the short disappeared again and the voltage was reduced from 800V to 500V. The short was back on Saturday morning and it was decided to run with a more robust power supply 70V 3A. The BLMs gave a reasonable signal and it was decided to continue like this over the week-end. The power supply will be replaced tomorrow with a lower current supply (in order to reduce the risk of damage).

In the night from Thursday to Friday a wrong current reading of NA PCs resulted in interlocks. The problem was traced back to the parallel data bus, which had to be checked out. The error was only detected and repaired on Friday morning.

During the night from Wednesday to Thursday, the SPS suffered from two glitches, one at 00.20 and one at 6.30. The first resulted in 30 min downtime, mainly due to re-establishing cavity one. The second glitch affected mainly MPS and RF power, for both of which a piquet intervention was needed. The SPS was back at 8.00.

On Friday evening an increased spark rate was observed with the FT production super-cycle. The duty cycle was reduced in order to ease the situation. On Saturday, all ZSs went down due a spark train interlock caused by ZS2 sparks. An expert was called in and the ZS was reconditioned at 250kV. Since then it is working and the nominal duty cycle was just recovered. It looks like the ZS needs a couple of days of reconditioning after every stop.

Wednesday MDs were very successful (slow extraction – chopped, lead81 to the transfer line, VGI monitor giving a profile, MD on BPMs). The LHC was very pleased with the 100 ns and 50 ns beams.



H. Vincke commented that following the recommendation of the ALARA committee, both the ZS2 and the ZS4 should be replaced at the same time if needed. **M. Hourican** added that the plan was anyway to change the five ZSs at the end of the year (if they survive until then). **K. Cornelis** said that in the present situation, it is better to work with a lower flux than stopping the production for weeks.

North Area

B. Rae said that apart from the already mentioned problems a cooling tower failure on Sunday led to a NA62 downtime of 16 hours.

North Area Users

H. Wilkens confirmed it was not the best week for the NA users and he thanked the SPS team for their effort to recover beam production as soon as possible.

AWAKE

E. Gschwendtner said it was a pretty bad week. They worked a lot on the e- beam trying to sort out an issue of cabling of a quadrupole influencing the e- beam trajectories. They will take protons during the next days and they might need to extend the run for a few days next week.

CLEAR

There was no report (Technical Stop).

HiRadMat

B. Rae said that the next experiment will start coming Monday. They will take 288 bunch trains, which is not compatible with present ZS limitations and the normal NA cycle. That would involve a stop of the NA physics during their run. They estimate up to 5 hours as time needed to complete their experiment.

LHC

E. Bravin said that the special run was extended for a few days last week. They are now back in normal production. Tomorrow, the LHC will request standard INDIV beams with different emittances for calibration. These requests will be sent to the injectors in due time.

TI

R. Ledru reported that there were 6 major glitches between Tuesday and Thursday.



3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

G. Rumolo said that tomorrow's MDs are dedicated in the SPS until 13.00 and dedicated in the PS in the afternoon from 13.00 to 18.00. Consequently, there will be no beam for any user from 13.00 to 18.00. The MD coordinators, PSB, ISOLDE and PS teams will discuss whether the beam could be sent to ISOLDE during the PS dedicated MD.

The beam request for the LHC MD block on week 30 will be circulated tomorrow.

4. AOB

The maintenance of the access door AD-TARGET YEA01.ADT=853 was approved ([Annex8](#)).

Next Meeting: Tuesday 17th July 2018.

Minutes reported by [JB. Lallement](#) on 12th July.



Summary of the 21st FOM Meeting

Held on Tuesday 17th July 2018

Agenda <https://indico.cern.ch/event/743864/>

- 1. Follow up the last FOM*
- 2. Status of the machines*
- 3. Schedule updates*
- 4. AOB*

1. Follow up the last FOM

K. Hanke chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 20th FOM](#) were approved.

No follow-ups were reported.

2. Status of the machines

Linac2 & Linac3

D. Kuechler reported on the linacs ([Annex 1](#)).

Linac2

Linac2 had a good week with 98 % availability. Two problems with quadrupoles on Friday (13th of July) and on Monday (16th of July) occurred. On Friday (13th of July), the interlock of the source was triggered due to a problem in a vacuum rack. A restart of the rack by the piquet solved the problem. Some power glitches caused the RF to trip.

Linac3

Stable performance of around 30 mA was reported. The source suffered from a slowly increasing problem. The number of breakdowns is increasing, which means no beam for 20 s each. An extrapolation predicted a severe impact on the operation. A solution was presented in the AOBs.

LEIR

S. Hirlander reported on LEIR ([Annex 2](#)).

A good week was reported for LEIR. A change of the Linac3 RF setting (tank 3 amplitude) on Wednesday (11th of July) brought an increase of the performance, which then was propagated to all



cycles. The improved diagnostics of the energy distribution makes the identification of small changes possible and saves a lot of time (hours up to days to recover from these changes - see slides). Only one major problem of the RF-Cavity 41 was reported. The change of the threshold in SIS by the piquet on Monday (17th of July) ended the series of continuous trips over the weekend.

PSB

G. P. Di Giovanni reported on the PSB ([Annex 3](#)).

It was a good week for the PSB with an average availability of about 94 %. Most of the downtime the week is associated with issues with the recombination kickers and the aftermath of a couple of electrical glitches, in particular, the one of Sunday (15th of July) evening. A stop on Monday (16th of July) was requested to fix the issue with the BSW14L4 3-phase contact, which had caused major downtime two weeks ago. The stop took about 1h30 minutes. During the stop, several experts profited to access the machine to successfully fix the BLM in section 5 (superior), which was out of order since few days and investigate a problem with BTM.BPM10, which unfortunately it was still not working. Concerning BSW14L4 there was still a mismatch CCV/AQN which will require another expert intervention without beam, so either during ITS2 or at the next available occasion. Several issues were observed with the production of the high-intensity beam in ring2 whenever the intensity was above 800E10 ppb. In particular, it was confirmed an issue with the H1 phase loop observed in previous weeks, and a new one manifested itself due to the C02 cavity dropping out either for a short period or entirely, un-bunching the beam at extraction and causing all extraction BLMs to trigger. The High-Level RF piquet was called to investigate this last issue, but he could not find anything obvious. Meanwhile, the production of TOF beam was moved from ring2 to ring3 and compensated for the losses of intensity with the other rings for ISOLDE. Tuesday morning (17th July) all went back to nominal settings.

On the positive news, proper preparation for the special dedicated MD thanks to the combined effort of BE-OP, BE-CO, BE-RF and TE-ABT allowed to perform the MD and go back in operation with minimal turnaround.

ISOLDE

J. A. Rodriguez Rodriguez reported on ISOLDE ([Annex 4](#)).

It has been a good and busy week at ISOLDE. Most of the work focused on the preparation and delivery of the first HIE-ISOLDE radioactive beam of the year (⁹⁶Kr23+ with an energy of 4.8 MeV/u to Miniball). The users have been taking beam since Wednesday (11th of July) evening (one day ahead of schedule) without any major issues. On (Monday 16th of July) the energy was changed to 5.3 MeV/u. The rest of the week was used to set up and target optimization.

In addition, there were several Bi isotopes delivered to IDS (Monday 9th July and Tuesday 10th July morning), several Xe isotopes for collections in GLM (Tuesday 10th July night) and ²²Ne7+ and ¹²⁹Xe31+ to Miniball (Monday and Tuesday night 9-10th July).

Some faults were reported. A problem of a controller of a power supply on of one the quads in one of the high-energy lines bought 3.5h downtime. The vacuum system at the REX-TRAP showed a problem, which is not completely understood.

ISOLDE Users

K. Johnston reported for the ISOLDE Users:



A short summary from the users from last week:

This week was the first HIE-ISOLDE run of 2018: ^{96}Kr @ 4.8MeV/u to Miniball for Coulomb excitation studies. This is quite an exotic isotope and comes with some stable contaminants such as ^{96}Mo . The expected rate of ^{96}Kr has been less than expected and the rate of ^{96}Mo has been higher than desired which has made things quite difficult for the experiment which is a precision measurement of excited states of ^{96}Kr . However, the machine has been very stable and the yields also steady over time. The users are very satisfied with the performance of HIE-ISOLDE and hope to be able to collect enough statistics to address the structure of the excited states of ^{96}Kr , but it will require some time before this is known.

In addition, collections of ^{131}Xe and ^{133}Xe (a new isotope for medical imaging) were successful and initial measurements are promising.

PS

H. Damerou reported on the status of the PS ([Annex 5](#)).

The PS had a difficult week with an average beam availability of only 87 %, caused by a number of faults lasting about 1-3 h each. The beams to the EAST area were cut for 1.5 h on Tuesday (10th of July), due to the Software Interlock System (SIS). The MTE beam was perturbed the same day, as the cycle in preparation for the dedicated Wednesday (11th of July) MD caused timing issues for the kickers. A problem with the recombination kickers of the PSB stopped all beams other than EAST during 2h30. On Thursday (12th of July), a fan needed to be replaced in the power converter of F61S.QFO01, resulting in 1h45 downtime for the beam to EAST Irrad. An access was organized on Friday (13th of July) to exchange the broken Mylar window (175 micrometer) in the F61 line by an aluminium window (200 micrometer). In total this took about 2h45 and the vacuum in the line seems fine since. On Saturday, all beams were stopped due to an issue with the airflow interlock of one of the 10 MHz tuning power converters. Finally, multiple trips of POPS lead to about 2h downtime for all beams on Sunday (15th of July).

For the dedicated MD with the injection SEM grids on Wednesday (11th of July) the super-cycle was blocked to prevent unintended injection of other beams.

The 25ns beam with various bunch intensities and batch length for the crab cavity MD has been prepared, as well as high-intensity (2E11 ppb) variant of the BCMS beam with minimum longitudinal emittance for the Thursday (19th of July) MD in the SPS. In view of the upcoming MD in the LHC, the 8b4e BC beam (32 bunches at PS extraction) has been revived. The setting-up of the low-intensity MTE beam and the ion beam to the EAST area have started by the operations team.

J. Somoza asked about the vacuum leak in SS90, and everything is ready for an access.

K. Hanke answered that Paul Demarest is on the access list and added that it has not high priority. He asked if there is the possibility to wait.

J. Somoza answered that it would be good to install some diagnostics. There is nothing critical in the sector. The access would cost two hours and can wait. It should be done before August, when most of the people are on holidays.

K Hanke closed the topic with the suggestion to leave the team on the list until the next FOM. If till the end of July nothing has changed, a slot will be freed.

East Area



A. Gebershagen reported on the East Area.

One issue was the window at the extraction of PS in the F61 line. The impact of the aluminium substitution is investigated on the performance until the end of the week was being tested. In case there would be another window made of Titanium.

H. Damerau asked if there is some additional diagnostics beside from the monitoring of the losses and the beam form at the BPMs at the end of the East Area.

A. Gebershagen answered affirmatively adding that a pressure sensor is missing.

East Area Users

There was no report on the East Area Users.

AD-ELENA

AD

L. Ponce reported on the status of AD and ELENA ([Annex 6](#)).

AD did not encounter major problems this week. The main sources of downtime for this week were no beam from injectors, several trips of the MAIN.QUAD mainly following electrical perturbation, several trips of the bend in line 6000 (DI.BZ6024), a preventive intervention has been done on Thursday (12th of July). Two electrical perturbation occurred over the week-end, but were recovered without problems in the shadow of the recovery of the injectors.

The total yield of the machine was not at maximum despite a good deceleration efficiency mainly due to limited intensity on the target and big fluctuations of the injected intensity (between day and night and shot to shot). The target leak problem was under control (no sign of leak since intensity is limited on target). The question raised if the limitation of intensity could be removed. It has to be decided by ABT, but no member was present at the meeting.

K. Hanke added that it is a serious decision to lift the intensity limitation, which needs to be taken at a high level (IEFC).

T. Erikson said that the agreement was to keep the intensity below $1.3E13$ and observe the leak rate. It has been zero for two weeks.

L. Ponce said that it was possible to extract $3E7$ until the beginning of this week (w28). Afterwards the value was at $2.5-2.7E7$, although the transmission rate along the cycle was around 85 %. The users would need a higher value. Also, the spread fluctuations shot to shot and day and night of the beam were higher at injection to AD. This made it hard to obtain a constant level.

The topic has to be discussed at the IEFC meeting.

AD/ELENA Users

H. Wilkens reported on the users.

The Alpha2 experiment completed. There was a first hint of the sign of G in the G experiment was found.

SPS

K. Lee reported on the status of the SPS ([Annex 7](#)).



The SPS itself had a rather good week. The availability was around 87 % with faults almost exclusively coming from the injectors. The only bigger problem in the SPS was a faulty input mixer of TWC 200 MHz line 4 which stopped the beam on Monday (16th of July) evening causing a downtime of 2h40.

The SPS served the LHC on Monday (16th of July) morning with inject and dump INDIVS for modification and validation of the AGK. This was followed by injection loss studies. The beam was stopped in the afternoon for an access in the PSB for the BE.BSW14L4 extraction bumpers. On Thursday evening, after the high intensity MD, the LHC took a set of special INDIVs prepared in the booster for the BSRT calibration. The rest of the week was dedicated to physics with 2556 bunches BCMS which went mostly without problems.

The fixed target beam was running at a slightly lower duty cycle over the previous weekend to relax the tension on the ZS. It was set back to high duty cycle on Monday (16th of July) night. ZS sparking was not a problem for the fixed target beam all over the week. Whenever possible, therefore the focus was on delivering fixed target beams at high duty cycle. The splitter BLMs were currently still running with the robust power supply (70 V/3 A) with missing interlock channels. A new power supply has been ordered but has yet to arrive to be prepared for installation. During middle of the week intensity fluctuations were noticed in T2. This is now being monitored more carefully. The source of these fluctuations was not yet understood.

AWAKE has taken beam during the full week. On Thursday (12th of July), the experiments had been perturbed by frequent interlocks. It was found that the AWAKE transfer line had one BPM, which apparently had a bad reading and another BPM, which was perturbed by the electron injection. Moreover, the thresholds for the interlocks were very tight already for the golden trajectory. On Friday (13th of July) afternoon, the AWAKE team decided to disable the BPM interlocks in front of the plasma cell in the AWAKE transfer line to help getting more stable conditions.

HiRadMat beams were prepared on Wednesday (11th of July) over night. The beam was in good shape. Three injections up to 216 bunches could be taken with the FT in parallel, the ZS spark rate remained calm. For four injections and 288 bunches, the FT beam was stopped with the ZS at -30 kV. Again, the ZS did not show an enhanced spark rate. It was agreed in the User Meeting that HiRadMat could take dedicated beams of 288 bunches over a period of 4 hours on Wednesday next week after the dedicated MD.

The dedicated MD on Wednesday (11th of July) was split in two different MDs. The first MD on slow extraction was completed successfully with all measurements taken as planned. The second part of the MD was dedicated to tests on the coast cycle in the SPS. During this MD, the CBCM in the injectors was blocked for reasons of security due to a dedicated MD in the PS. Hence, all supercycles had to be prepared and set up before.

Unfortunately, however, the coast sequence itself could finally not be launched as it needs to access the CBCM config folder. Hence, the coast tests could not be made. Nevertheless, the time was then used for an access where among others, the QF51610 support could be installed.

The high intensity run took up to four batches at intensities up to 2E11 ppb. In the morning, mainly longitudinal measurements were made. It turned out, that sensible results could only be achieved with a maximum of three batches at bunch intensities at 1.3E11 ppb. In the afternoon, high intensity beams were taken with the headtail monitor acquiring in multi- acquisition mode to investigate the transverse beam stability in these conditions. A large amount of data was taken that needs to be analyzed offline. During these tests, it was also found that the TT40 and TT60 extraction elements



were pulsing on the LHC50NS user. They could not be turned off as the cycle does not have a particle transfer (and AWAKE was taking beam in parallel). The pulses impacted the vertical beam orbit leading to high losses for the high intensity beams. The MD was stopped early since the LHC had to refill.

The SLAC team was here for this week and the next to progress on the wideband feedback system studies. The slotline kicker has been taken into operation. First tests indicated a clear increase in bandwidth. A polarity error was found which was fixed on Friday during an access.

During the nights, MDs were ongoing to investigate further horizontal instabilities and the stabilizing mechanism of Q".

During the weekend (w28), there have been several problems mainly in the injectors with finally an electrical glitch just at the moment of global discharge of tension as France won the world cup.

North Area

There was no report.

North Area Users

H. Wilkens reported on the North Area Users.

It was a problematic week for the experiments. NA61 had problems with the cryo-system. The vertex magnets stayed off for five days.

AWAKE

There was nothing to report.

CLEAR

There was no report.

LHC

M.Zerlauth reported for LHC via mail:

After recent thunderstorm and 16L2 event, finished a recovery fill with 980b Monday morning before reverting back successfully to a 2556b fill overnight. Continue standard physics with 2556b throughout the week with the following exceptions:

- WED afternoon: Access to clear out a number of smaller issues
- FRI: Few tests for injection setup in preparation of ALICE polarity inversion (pilots and nominals)
- MON morning: Start of MD block #2, Heiko Damerou reported yesterday in the common coordination meeting that all beams are already ready from the PS side for the MD (mostly standard beam, apart from one MD with short 8b43 batch of 32b).

TI

J. Nielsen reported for TI ([Annex 8](#)).

On Monday (9th of July) 17:19 a communication failure with a big part of LHC point 7 occurred, caused by a misconnected cable. On Saturday (14th of July) there was a strong electric perturbation, which was confirmed by EDF. Many of the accelerators were impacted by this perturbation: L2/PSB/PS/SPS/LHC.



Concerning the powering of EMD4*25 POPS-B/building 245, on Thursday (19th of July) EL-OP would like to just power the switchboard, which was approved ([Annex 8](#)).

3. Schedule updates

K. Hanke presented the injector schedule ([version 1.6](#)).

H. Bartosik mentioned that there will be no beam sent to the North Area during the MDs.

D. Kuechler said that they have a problem in the source of Linac2. The spark rate increased rapidly since Friday (13th of July) and an access was urgent.

It was agreed on an access between 8h and 8:30h on Wednesday (18th of July) at the beginning of the MDs.

4. AOB

[Problems with the extraction system of the Linac3 source and a proposal to fix it:](#)

D. Kuechler reported on this AOB ([Annex 9](#)).

At the moment, an average of around 20 sparks per day in the Linac3 source were observed. In the past, there were not more than 5-10 sparks per day. An extrapolation of this led to a severe impact during the physics run. The suggested solution was to replace complete source extraction system since all spare parts were ready. The suggested date was the 13th-17th August (to have all experts needed available and to have enough time to fully recover intensity and stability before the physics period).

The FOM approved this proposal.

[LHC MD2 beam requests for the injectors:](#)

The LHC MD2 beam requests for the injectors can be found in [Annex 10](#).

[Access point maintenance YEA01.SWY=151:](#)

The maintenance of access point YEA01.PSB=361 from 18th July 08h30 till 19th July 17h00 was approved ([Annex 11](#)).

Minutes reported by [S. Hirlaender](#) on 19th July.



Summary of the 22nd FOM Meeting

Held on Tuesday 24th July 2018

Agenda <https://indico.cern.ch/event/745816/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Schedule update*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 21st FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

JB. Lallement reported the status of the linacs ([Annex 1](#)).

Because of a high spark rate, the Linac2 source HV column was cleaned on Wednesday (20 min beam stop). The spark rate returned to normal values in the following days. During the night from Sunday to Monday, one of the 2 vacuum pumps of the DTL tank2 stopped. It was successfully replaced yesterday, from 11.00 to 13.00 by the vacuum team.

The Linac3 had a pretty good week with very stable beam current out of the linac since the oven refill on Thursday.

B. Mikulec wondered why it took more than 2 hours to replace the vacuum pump in Linac2.

J. Ferreira answered that the intervention went fine, but given the weight of the turbo pump and the size of the flanges it is normal that it takes 2 hours.

LEIR

N. Biancacci presented the status of LEIR ([Annex 2](#)).

It was a good week for LEIR with an availability of 97%. On Wednesday, a 90% injection efficiency was reached on the NOMINAL-type cycle and the LIU target was reached on Friday after optimization of the AMDRF. The smooth operation over the weekend allowed for the detection of the sources for the performance drift in LEIR (especially correlation between ETL corrector currents and temperature).



PSB

V. Forte reported on the PSB status ([Annex 3](#)).

It was a very good week for the PSB with 98.8% availability. RF specialists solved high intensity limitations on R2 (and TOF was brought back from R3 to R2), the new White Rabbit B-train reliability run was extended to all the OP and MD beams, the chirp tune excitation was successfully commissioned and the LHC MD beams for week 30 were finalized.

There were some spurious losses on the ISOLDE beam (BTY line), which initially obliged the OPs to re-steer the beam. The losses were traced back to a drift CCV/AQN of BT.BHZ10 (thought to have been solved by the piquet after a PC reset). However, the problem is not solved and the ADC card has to be replaced (a 20-minute beam stop has to be planned).

Different MDs were carried out (studies on instabilities at 160 MeV, extraction bump tuning, Q3 studies, phase scans with TFB, K-scan on the BTM line and dispersion-free measurement optics with LHCINDIV beams and different dp/p).

B. Mikulec said that the 20-minute beam stop needed to change the ADC card would be scheduled after the meeting in agreement with all the machines.

ISOLDE

E. Matli reported the status of ISOLDE ([Annex 4](#)).

It was a very good week at ISOLDE during which the machine and target behaved very well. $^{96}\text{Kr}23+$ ions were delivered to MINIBALL at 4.8 MeV/u until Friday when they switched to $^{212}\text{Rn}50+$ at 4.35 MeV/u. There were only a few minor issues related to RF cavities, line heating and UPS trips.

ISOLDE Users

K. Johnston confirmed it was a very good week for the physics at ISOLDE. From the middle of the week onwards the first HIE-ISOLDE run of the year measuring ^{96}Kr ran until Friday morning. Although the yields were lower than expected, many new data were obtained and the main physics goals were achieved. There was then a change to ^{212}Rn which ran over the weekend, also for HIE-ISOLDE. In this case the yields were much higher than expected and the experiment was able to perform many more measurements than had been expected at MINIBALL. On Sunday night a collection of ^{133}Xe for medical imaging was also successful.

PS

K. Hanke reported the status of the PS ([Annex 5](#)).

It was an excellent week for the PS with 99.1 % availability and only short resets and reboots of the RF and power supplies. A trip of the FTN power supplies brought down ToF beams for 55 minutes. An access was given to the vacuum team to investigate vacuum issues in SS90. A leak was found ($5.0 \cdot 10^{-7}$ mbar l/s) on the body of a wide band pickup. The precise location of the leak could not be found, but



the team suspects one of the feed-troughs. As no spare is available, the vacuum team is looking for a vacuum chamber that could be installed instead should the leak develop further.

The nToF delivered integrated intensity is still well ahead of schedule. After discussion with the nToF team, it was agreed to deploy the new ToF cycle on August 1st.

J. Ferreira proposed to have the intervention on the BPM scheduled during the next technical stop. **K. Hanke** said that as far as the vacuum degradation being only problematic for the ions, the intervention could in fact wait for the next technical stop.

East Area

B. Rae said it was a very good week for the East Area.

East Area Users

H. Wilkens said that the users were happy.

nToF

D. Macina said that they suffered from synchronization issues due to the change from ring2 to ring3 for the production of the nominal TOF cycle. The situation returned to normal since the ToF beams were again produced from PSB R2. Concerning the deployment of the new cycle, the exact date should be refined and discussed with the PS team, as they should be in the middle of an experiment on Friday next week. On Tuesday and Wednesday they will be in access mode in order to change the experiment in EAR2...

AD - ELENA

L. Bojtar reported the status of AD ([Annex6](#)).

It went pretty well during the week until yesterday when a major vacuum leak developed in the E-cooler section. Investigations are still on-going to localize precisely the leak location. **J. Ferreira** confirmed that they are following this up very closely. In case the leak could not be found precisely or repaired, the entire collector should be replaced and that could take up to a month.

Concerning ELENA, **T. Eriksson** reported that the first Pbar beam was sent to the Gbar experiment on Friday with only 15% efficiency. As there are currently no Pbars from the AD, they will be working with H⁻ for the next days. He added that the decision to change the extraction line was not taken.

AD users

H. Wilkens said that the experiment was changed in ASACUSA. Users are worried about the AD E-cooler vacuum issue.

SPS

F. Velotti reported the status of the SPS ([Annex 7](#)).



It was a very good week at the SPS, with about 96% availability for the fixed target beam.

The HiRadMat TCDIL experiment was completed within 1.5 hours with not SFTPRO cycle due to ZS limitations. On Thursday the RF experts had to re-check the cavity phasing with the phase pickups, as a drift of 40 deg was previously observed (this was due to the module replacement of the previous week). Their intervention took 3 hours. There was an issue on an extraction sextupole, which showed very a strange behavior during the weekend. The current sent became suddenly completely wrong, but the state was still cycling. On Sunday night, other elements (MDH43007 and MDH42807) whose FGCS are connected to the same server showed the same behavior. It happened several times, and this issue is being followed up by EPC experts.

North Area

B. Rae said that it was a very good week.

North Area Users

H. Wilkens confirmed that the HiRadMat run was very effective. It was also an excellent week for the North Area with more than 5000 cycles a day over the weekend.

AWAKE

There was no report.

CLEAR

There was no report.

HiRadMat

F. Harden said they were very happy and they gained experience in handling efficiently Supercycle switches and changes. **B. Mikulec** added that someone from HiRadMat should be involved in the injector planning discussion loop and asked **F. Harden** to send a HiRadMat planning update to **R. Steerenberg**.

LHC

J. Wenninger said that they fully recovered from the technical stop with 100% availability and 80% of the time in collision during the weekend. They will resume standard operation on Saturday morning.

TI

J. Nielsen reported that the intervention on the powering of EMD4*25 in the POPS-B building took place as agreed in the previous FOM.



3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

G. Rumolo said that next week's dedicated injector MD block was moved to this week. Next week's parallel SPS MD will take place on Wednesday. There is no HiRadMat run next week.

E. Mahner reminded that there will be no ions from the Linac3 during week 33 (see last FOM report).

4. AOB

The maintenance of the access door YEA.TFP=801 (nToF primary) was approved ([Annex8](#)).

Next Meeting: Tuesday 31st July 2018.

Minutes reported by [J.B. Lallement](#) on 26th July.



Summary of the 23rd FOM Meeting

Held on Tuesday 31st July 2018

Agenda <https://indico.cern.ch/event/746861/>

- 1. Follow up the last FOM*
- 2. Special operational issues during the weekend*
- 3. Schedule updates*
- 4. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 22nd FOM](#) were approved.

No follow-ups were reported.

Linac2 & Linac3

R. Wegner reported on the linacs ([Annex 1](#)).

Linac2

The availability was very good before the weekend with an availability of 95%. There was an increased spark rate of the source during the week (w30), which was at normal rate after a HV source column cleaning (~10 sparks a day). On Monday (23th of July) a replacement of the 2 tank2 turbo pumps with a duration of 2h45 took place. A power glitch took down a lot of systems including vacuum power converters and RF and it took 5h to recover. There were two short trips on Saturday (28th July) and Sunday (29th July). An ion pump of the RFQ stopped on Sunday (29th July) and was repaired on Monday (30th of July).

Linac3

It was a good week, only the source RF generator stopped for ~20 min on Wednesday (25th of July). An oven refill was planned on Thursday (2nd of August). The glitch on the weekend (w30) affected many systems and the source was restarted on Monday (30th July). The RF showed still problems and the RFQ anode power supply controllers had to be changed. The tank 3 high voltage modulator started to oscillate. All parts, which could be easily exchanged, were already exchanged on Monday (30th July). By detuning the ripple could be reduced, which points to the issue of a damaged tube or resonator. An exchange was planned for this afternoon (Tuesday 31st July) and needs several hours.

LEIR



N.Biancacci reported on LEIR ([Annex 2](#)).

The availability from Tuesday (24th of July) to Friday (27th of July) was not so bad until the glitch on Saturday (28th of July). On Sunday (29th of July) an access was needed to restart KFH31,2,4. On Monday (30th of July) several devices needed a restart/reset and for the ER.SMH11 an access was performed (water flow problem). The e-cooler was not working and two knobs are now in “local” for monitoring (ECNDH6, ECNDV7). The high intensity NOMINAL beam ($>9e10c$) was successfully delivered for the PSI MD to the LHC. Space charge studies were performed to compensate a resonance. Temperature and energy drift studies were ongoing as well. Additionally, the new Schottky system in LEIR is now in an operational state.

PSB

J.F. Comblin reported on the PSB ([Annex 3](#)).

The PSB had a hard week. During the week (w30) besides minor problems the wire scanner R1H got stuck in the beam and RF ring 2 problems with high intensity beams re-appeared. On Saturday (28th of July) the 18kV station tripped. At 8h53 practically all the equipment tripped: power converters, RF, kickers, septa, distributors, vacuum, water station. At 10h15 green light was given to restart. At 14h17 Linac 2 was ready and it was tried to inject beam into PSB. In the following, several problems occurred. The White Rabbit was not working because the rack was off. Ring 3 was not captured and the LLRF rebooted the FEC and launched a restart script. For the transverse feedback a lab power supply had to be restarted. The piquet timing and EPC-CO were called because of an unstable current at the extraction correctors. It was due to an old problem of the screen that overloaded the CPU of the 1553. The PIPO had to check some power converters, which were not appearing in fault in LASER, but showed no acquisition of the current. On Saturday (28th of July) the MPS tripped at 21h56 and the PIPO was called back for the MPS. An ‘over tension’ fault on one group was found and two fuses were changed. After restarting, ~40 fuses protecting the thyristors broke. The TE-EPC major event piquet (**D. Aguglia**) was called. No short-circuit was found. On Sunday (29th of July) at 9h47 all fuses were changed. Tests with a ZERO cycle and then with the 160 MeV and finally the 1.4 GeV cycles were done. At 12h57 **D. Aguglia** gave the green light to use the MPS again. It caused a total downtime of 15h01m. Around 13:00 the BI2.DIS tripped and the ABT piquet and the specialist changed the thyatron. After restart, a transformer burned. The HV crate was replaced by a (very old) spare, without success. Finally, the working transformer from the spare crate was put in the initial crate. The downtime was 7h26m. The total downtime of these consecutive events was 37h. On the positive side there was the information that the BT.BHZ10 drift problem was solved and the MDs were not affected by the problems.

B. Mikulec mentioned that the temperature problems, which occur across all the machines should be investigated. The renovation of the ventilation system of the PS complex during LS2 had been cancelled. In many buildings, there was a problem due to high temperature. The question was if the situation remains unchanged after LS2.

M. Amarilla Garcia answered that for the PS and the North Area the cooling towers and the control system will be changed. For some buildings, the cooling system will not be changed. It would be good to have a priority list with the major issues.

B. Mikulec asked if there would be monitors for the temperature evolution in the equipment rooms of the PSB installed as discussed some time ago.

M. Amarilla Garcia answered that she didn’t know and it has to be checked.



ISOLDE

L. Fadakis reported on ISOLDE ([Annex 4](#)).

It was an intense week for ISOLDE. Five beams were prepared and delivered. Mainly Miniball and HRS were served. There is a recurring problem with a power converter in the C0 line (3h downtime) since one year. Resetting solves the problem, but is not a solution. After the power cut on the weekend the problem was the liquid helium level in the cryo-modules. It took around 12h to recover and recovery was still ongoing. A superconducting cavity was tripping 84 times since Saturday (28th of July). Since the experiment is over, the experts will have a closer look into it now.

A great thanks to all helpers on Saturday was spoken out.

B. Mikulec asked if someone from EPC is following up the recurring issue of the power converter.

L. Fadakis answered that it was mentioned to the EPC team. At the beginning the suspect was that it was an isolated module. All cables for the interlock system were replaced, which did not solve the problem. Since the issue is occurring at random times it is not easy to be understood.

ISOLDE Users

K. Johnston reported by email for the ISOLDE Users:

Before I left Miniball were taking 228Ra and 222Ra for Coulomb excitation experiments. These are the heaviest isotopes taken through HIE-ISOLDE for physics so far and the machine has been working very nicely. It was a busy week for the operators with many changes of settings but the results from this experiment look very promising.

On Friday, the plan was to switch to 142Ba (also for coulomb excitation) and run this over the weekend. However, the power cut on Saturday put paid to the schedule. In the end this run was extended until this morning, although I don't know if the data from the weekend are good or not.

However, the users would like to express their sincere thanks to the operations team for carrying out the dense schedule (on time) from last week and for their efforts in bringing the machine back to life from the power cut on Saturday, which wasn't foreseen.

PS

M. Fraser reported on the status of the PS ([Annex 4](#)).

A fault on the TT2 transformer started all issues on Saturday (28th of July) in the morning. There was still a problem on the LHC beam control. No multi-bunch beams could be delivered to LHC since Monday (30th of July). Before Saturday (28th of July) the availability was 94% and the MDs were very smooth. The vacuum leak in SS90 (WBPU) is stable. On Tuesday (24th of July) a faulty water level switch in a cooling tower resulted in a temp. interlock on the PS main magnet circuit tripping POPS. A piquet intervention was needed before a restart. On Wednesday (25th of July) a cooling water leak in PS was reported by TI, which was stable at 20 l/h. An access for an inspection of 1-2h was requested. The access was not possible at the weekend (w30) for various reasons. On Thursday (26th of July) evening a few trips from the PSB MPS occurred. On Friday (27th of July) evening stability issues again on Ring 2 in PSB was observed. A switch back to Ring 3 on TOF was necessary. It is likely to stay like this for a further 2 weeks.

A first sign of trouble was on Saturday (28th of July) morning at 07h41. Many TT2 power converters tripped, went in local mode and the piquet was called. This was caused by a fault on the 18 kV



transformer station (EMD104) and brought a down time of 13h. Beam delivery was continued to the East Area until about 08h55. An electrical glitch followed 1h later at 08h55, tripping the entire CPS. It had huge implications and it was hard getting equipment up and running. The PSB-PS operation teams spent the day coordinating piquet teams to get things back up and running. Thanks to all involved! PS was ready for EAST at about 16h00 but the beam from PSB was unstable. Problems with PSB TFB and correctors in BT were ongoing. The team managed to accelerate a parasitic TOF and the PS looked OK. At 20h50 EMD104 was repaired, but there was a delay due to beam set-up in PSB until the MPS failed at ~22h00.

On Sunday (29th of July) the PSB MPS was fixed at ~14h00 allowing INDIV and EAST beams in PS. An issue with SMH57 could be identified. The interlock settings were changed after a reboot caused by the glitch. For TMS a local reboot was needed to get it going. Issues with the distributor/PSB extraction bumpers delayed the PS start-up to ~22h00. The KFA45 module 2 was found not pulsing (due to bad contact in electronics rack) and it survived in a degraded mode with 3 modules overnight. It was fixed by expert on Monday (31st of July). The LHC (single bunch), MTE, TOF and EAST beams were up and running before midnight. Other minor issues were solved throughout the night.

A Major on-going problem with 40/80 MHz cavities since the restart on Sunday (29th of July) evening was reported. No multi-bunch LHC beams could be produced since the start-up.

Concerning the fault status for the 40/80 MHz cavities, the piquet was called at 1h19 on Monday (30th of July) morning for a 20 MHz cavity fault, which was solved, but was followed immediately by the 40/80 MHz LLRF control issue. The piquet was unable to fix the problem before supported by RF colleagues in the morning after a whole day of work.

LLRF team (thanks to Nathan Pittet and the LLRF team) reported that the phase loop did not lock at flat-top on LHC beam, making the double splitting tricky to set up. The problem seemed to be linked to the synchronization of the PS to the SPS frequency just before the RF manipulations at flat top. 12 bunch trains could be produced by keeping the 10 MHz gap relays open and modifying the phase loop starting times. 48 bunch trains could not be set up because the second double splitting failed. The investigations were ongoing at the time of the report. So far the down-time was 32h.

East Area

There was nothing special to report.

East Area Users

H. Wilkens reported on the status of the East Area Users.

In the East Area the experiments are P349 (anti proton polarization) and PANDA (for FAIR at GSI Darmstadt), both can benefit from an increase in cycles.

nToF

There was no report.

AD-ELENA

P. Freyermuth reported on AD and ELENA.



AD

AD had e-cooler problems (as reported in the last FOM) and there was no availability. There was a lot of work ongoing in the tunnel.

C. Pasquino added that the vacuum situation was not affected by the glitch on Saturday (28th of July) since the team was on site (because of PS issues) and was able to restart the bake-out. Today (31st of July) there is the cool-down.

B. Mikulec asked when it is expected that the e-cooler bake-out will be finished.

C. Pasquino answered that it should be finished on Thursday (2nd of August).

B. Mikulec asked if the beam might already be available on Monday (6th of August).

P. Freyermuth said that it could be.

ELENA

Last week (w30) ELENA was working only with the H- source. Some equipment was exchanged inside the Faraday cage. It was then managed to inject the 85 keV H- beam, decelerate to 1 keV and extract to the experiment. Although only a few particles could be used, everything seems to work.

AD/ELENA Users

H. Wilkens reported on the users.

Nothing special to report.

SPS

H. Bartosik reported on the status of the SPS ([Annex 6](#)).

The SPS was not directly affected by the glitch on Saturday (28th of July).

A DataBus problem was affecting power converter issues in the North Area (polarity could not be switched, glitches on some magnets, ...). A dispatching box and a card had to be exchanged. A new power supply for the TT20 BLMs was installed on Friday (27th of July) to replace the one, which was temporarily installed a few weeks ago after issues with the trips of the HV. The LHC MDs were very successful with the highlight of the partially stripped ions (Pb81+). There was no beam for the LHC even after glitch recovery Sunday (29th of July) night due to the issues with the blocked sequence editor and the PS RF systems.

North Area

There was nothing special to report.

North Area Users

H. Wilkens reported on the North Area Users.

It was a tough week for the experiments. There was a loss of cryogenics and a spectrometer. NA61 suffered from high sparks, which might have been caused by the change of supercycles during the LHC MDs.

AWAKE

There was no report.



CLEAR

There was no report.

LHC

J. Wenninger reported on the LHC.

The MDs were extremely successful. On Wednesday (25th of July) evening some problems occurred. The glitch on Saturday (28th of July) was not strongly affecting LHC. Only the second trip ~10h00 brought down almost everything, with no long-term consequences. A cryoplant was cleaned because the filters were clogging. Every commissioning scenario was tested while waiting for the multi bunch beam. A 12-bunch proposal was mentioned, which might not be very handy due to the long filling time.

TI

R. Ledru reported for TI.

Except for the PS issues no major issues were mentioned.

2. Special operational issues during the weekend

D.Bozzini reported on the major event on Saturday (28th of July) for EN-EL ([Annex 7](#)).

The root fault was a trip of the 18 kV feeder EMD104*24 in the substation ME24 (building 269). This affected the ISOLDE loop and TT2 and caused a trip of the injectors. A similar issue happened already on the 5th October 2015. The trip was caused by the high temperature and humidity variations. The oxidation of copper contacts initiated partial discharges followed by an arc flash from phase to ground.

A side effect was a trip of two out of three transmission lines between two Meyrin substations. The third transmission line tripped due to overload just before stand-by team intervention. This major impact on the Meyrin supply was readily resolved by the stand-by team. The same behaviour was experienced in 2015. The problem (already known) was caused by the wrong cabling of current transformers in extremely old cubicles in substation ME9.

The status and the planned actions were the repair of cubicle in ME24, which was carried out successfully by EN-EL. The network was back to nominal at 20h45. The ME24 mid/long term solutions were under study. The side effect fault will be resolved during LS2 when the ME9 substation will be fully refurbished. A more detailed report will be presented at the TIOC. The correlation between the EN-EL trip and the blow-up of fuses on the PSB MPS (TE-EPC) were still under investigation.

B. Mikulec mentioned that this raises again the question if there can be done something to prevent temperature/humidity-related problems, since this is not the first time that something like this happens.

D.Bozzini answered that he had experienced another similar event in LHC point 1. Due to the design of the substation, if the temperature is not regulated as it should, these problems were created.

B. Mikulec concluded that there should be a solution found together. Especially for the time between LS2 and LS3.



D. Aguglia reported on the major event on Saturday (28th of July) for TE-EPC ([Annex 8](#)).

On Saturday (28th of July) at 9h00 the PIPO was called by TI for SVC Meyrin. The SVC was put back on at 11h00 (this was a normal intervention with EN-EL). At 11h00 it was tried to put the PSB MPS back on. There was an interlock on the trim of the MPS, which was caused by a few components that got destroyed. This could only happen by switching on-off several times and might have been caused by a failure in the electronics and not by the glitch. The spare of the trim was put back and at ~14h00 the MPS was back on. At 22h30 there was another phone call for the MPS. An over voltage fault was found and the piquet called TI to ask if there was a network event responsible for this, but nothing was noticed. At 20h50 the loop was already closed.

B Mikulec said that the MPS tripped at 20h55 (from Timber). It would be important to further investigate if the 2 events could be related.

D. Aguglia continued that he was called on Sunday (29th of July) at midnight, because 40 power fuses were found blown up. It was decided to perform a general check out of the MPS, which took some time, because the cause was on the load not on the network side. Finally, the decision was to repair only one module. Between four and six fuses were changed on the module with the least blown-up fuses. This was done because if one puts the ZERO sequence in the PSB only one of the four modules of the MPS needs to work to maintain the 400 A of the stand-by current. In this way, it was possible to test at low risk if there was a short circuit somewhere. The test at 2h15 was good. At 8h30 in the morning an intervention was organized with the LHC, injector, and ME piquets to replace all fuses. At 12h30 the MPS was turned on. At this moment, a transient voltage suppressor blew up. This pointed to the fact of an over voltage. It was replaced and at 13h00 everything was back on. The status of the MPS at the moment of the presentation was that one spare module was still in fault and was going to be replaced during the day (31st of July). The MPS's Trim B was in a more critical state. 28 spare fuses were left and new fuses were ordered. It is not clear why the 40 fuses were blown up.

For the future, all converters will be replaced by new ones (during LS2).

B. Mikulec said that the MPS will still stay as a backup solution. The timings of the events should be checked and it might be better for the future to turn off the MPS before arming the system to avoid the same scenario.

M. Hourican reported on the intervention on Sunday (29th of July) for TE-ABT ([Annex 9](#)).

At 13h30 the piquet was informed and did some diagnosis and called the equipment specialist (the parts are 40 years old). There was a problem on the inside of the thyatron, which was changed consequently. After switching all back on, smoke came out of the back indicating another problem. The fire brigade came and identified the faulty component. **H. Gaudillet** (25 years of experience) was called and the thyatron, the burned capacitor and the transformer were changed. Several thyatrons are available as spare and five transformers are ordered. Due to the age of the components, the exchange is very tedious. ABT had a lot of work during the week end in all injectors as listed in ([Annex 9](#)).

3. Schedule updates

B. Mikulec presented the injector schedule ([version 1.6](#)).



H. Bartosik said that there is no dedicated MD on Wednesday but instead the Long parallel SPS MD will be performed on Wednesday instead of Thursday as discussed already during the last FOM, pending the availability of the LHC beam from the PS needed for the MD. All physics users will be served normally.

4. AOB

No AOB was reported.

Minutes reported by [S. Hirlaender](#) on 2nd August.



Summary of the 24th FOM Meeting

Held on Tuesday 7th August 2018

Agenda <https://indico.cern.ch/event/748744/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Report on recent PS RF issues*
- 4. Awake run#2 report*
- 5. Schedule update*
- 6. AOB*

1. Follow-up of the last FOM

V. Kain chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 23rd FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

F. Di Lorenzo reported the status of the linacs ([Annex 1](#)).

It was a good week for the Linac2. Because of a high source spark rate, the source was stopped for 40 minutes on Friday afternoon for a high voltage column cleaning. The spark rate went back to normal values since then.

Linac3 fully recovered on Tuesday afternoon from the power cut on the previous weekend once the IGBT plate and the RF tube of the tank3 amplifier were replaced. The source ovens were refilled on Thursday and the SEM-Grid downstream the RFQ was installed in the shadow of this scheduled stop. Except of a few HT source trips, the linac stably delivered 24-25 uA ion intensity to LEIR.

LEIR

S. Hirlander presented the status of LEIR ([Annex 2](#)).

It was a short, but good week for LEIR. After the ion beam was back from Linac3 on Tuesday afternoon, there was an issue with orbit correctors (ER.DWV41 and ER.DEV22). The LIU intensity was



quickly recovered on Friday after the oven refill. New stripping foils were tested during the weekend. After energy measurements, a good injection efficiency was obtained yesterday with a new foil.

PSB

S. Albright reported on the PSB status ([Annex 3](#)).

It was a very quiet week for the PSB punctuated by a few short stops, with 3 longer ones just over an hour in length for BR3.C04, MPS and BTM.QNo05). The challenge for the week was a combination of the outside temperature, which prevented sufficient cooling of the MPS and the shortage of fuses, which lead the expert to request the call of the Piquet for any trip of the MPS. In order to prevent the MPS overheating and tripping, which would lead to a longer stop than usual whilst waiting for the Piquet, the operator monitored the temperature of the cooling water and removed cycles if it was getting too high. As a result, there was occasionally a slightly reduced duty factor for physics.

All operational beams are available. The Finemet cavity is up and running (reliability run to start soon). Investigations are on-going concerning the intermittent loss on Ring 2

ISOLDE

E. Siesling reported the status of ISOLDE ([Annex 4](#)).

It was a very busy, productive and successful week at ISOLDE with a very dense schedule but relatively few operational issues. There were still instabilities in the cryo plant affecting especially the HIE ISOLDE SRF cavity 06. It was decided to isolate it and compensate with the remaining cavities. It involved re-phasing of the SRF cavities after SRF06 to insure the requested energies for the rest of the REX/HIE_ISOLDE run to MINIBALL.

There was one more run on HRS on Tuesday evening with $^{142}\text{Ba}^{33+}$ at 4.2MeV/u to MINIBALL.

On the GPS side, the setting-up of the separator, proton beam and yield checks took place on Tuesday on MINIBALL and the run started on Wednesday with $^{222}\text{Rn}^{51+}$ at 4.2MeV/u, $^{224}\text{Rn}^{52+}$ at 5MeV/u and $^{226}\text{Rn}^{52+}$ at 5MeV/u.

On Tuesday the old tapestation broke (blocked motor) just after the Rn yield measurements. Its repair is scheduled for today (after the run finishes). On Sunday at afternoon, the line of the GPS target broke and put an end to a very successful run.

ISOLDE Users

K. Johnston said it had been a very good week at ISOLDE from the users side. Coulomb excitation of Ba and Rn isotopes was carried out at MINIBALL. Very good data were obtained on ^{142}Ba , ^{222}Rn , ^{224}Rn and ^{226}Rn , most of which have never been measured before. The experimental program was essentially fulfilled with the exception of one final measurement which wasn't possible due to the line of the target breaking on Sunday. This was a very demanding week on the operations team with many changes of isotope and energies for HIE-ISOLDE. The users want to express their thanks to all in the operations team for being able to fulfil such a dense program within the constraints of the working week.



PS

M. Fraser reported the status of the PS ([Annex 5](#)).

It was a very good week for the fixed target beam with an availability of 95%. The situation was rather different for the LHC. On Monday morning the LLRF team took over from the piquet and continued working on the LHC beam control all day without success. During the day on Monday and overnight the LHC continued with single bunch injections. An access to adjust the MKBV voltage (LHC dump vertical dilution kicker) was urgently rescheduled on Tuesday to give the PS LLRF team time to work in the shadow of LHC accesses originally planned for later in the week. By the end of the day on Tuesday, 12 bunch trains could be produced and were used to carry out a 600 bunch fill of the LHC overnight (trains of 36 bunches from the SPS). On Wednesday noon, a timing (PAX.SSWH84REF for h = 84) was found enabled since the troubles at the weekend. Once disabled, and with the phase loop gain correctly adjusted, the 48 bunch LHC BCMS beam could be used to fill the LHC in the afternoon after a total of 60 hours downtime. The last injection of the fill was interrupted due to the trip of a power supply on a FEC for the RF beam control, needing a Piquet intervention. The list of other minor issues was given.

On Thursday afternoon the new TOF cycle was successfully rolled out. It will significantly reduce the induced radio-activation of the PS ring. The integrated intensity delivered to nToF is still ahead of schedule.

East Area

There was no report.

East Area Users

H. Wilkens said the users were happy.

nToF

M. Barbagallo said that the nToF team was very happy with the new TOF cycle, both in terms of timing and transmission.

AD - ELENA

P. Freyermuth reported the status of AD ([Annex6](#)).

The faulty parts of the AD E-cooler were successfully reassembled and it still requires few days to complete the reconditioning. Vacuum valves are now open and the beam will be back in the machine pretty soon.

ELENA ran with low energy H⁻ and it took some days to recover from the power cut. Some FGCs settings were lost. An RF amplifier was broken and generated high frequency noise. For the first time this year, H⁻ were injected at 85 keV, accelerated up to 4.3 MeV and decelerated to 100 keV.



V. Kain commented that the loss of the FGCs settings was a recurrent issue that seems to affect all the machines. A list of the different FGC settings related issues will be collected for all the machines.

An action was opened

Inventory of injectors FGC settings issues – **B. Mikulec**

AD users

H. Wilkens said that the ATRAP experiment had a vacuum leak. They will need to warm-up and cool-down again in a 2 week time. The shifts will be re-arranged with other experiments.

SPS

K. Cornelis reported the status of the SPS ([Annex 7](#)).

It was a very good week for the fixed target beams. On Monday and Tuesday SPS suffered a bit from an unstable MTE (5th turn) resulting in an unstable spill for slow extraction. Stability was recovered after adjustments on Tuesday afternoon and NA62 is happy since. During the night from Wednesday to Thursday there was a 40min stop due to orbit correctors in sextant 5 which were stuck at a DC current of 0.6 A (once again, FGC related issue). A PSU for acquisition and DAC card had to be changed. During the very hot periods the duty cycle was reduced in order to keep the cooling circuits below the trip level. Even after the increase of intensity to the North area (50 units on T2), the ZS spark rate is still OK. The pressure is slowly rising in 3.12 and an access will be most probably needed in the coming days for a leak detection.

Due to issues on the PS LLRF, the full LHC beam was only back on Wednesday.

North Area

There was no report.

North Area Users

H. Wilkens said that the NA62 users were very happy with the spill adjustments and that the North Area received a remarkable amount of spills during the weekend.

AWAKE

See Point4.

CLEAR

A. Curcio reported the status of the SPS ([Annex 8](#)).

They were still working on the CLIC module connection to a high-power X-band klystron. Activities are scheduled to restart toward the end of August.



HiRadMat

A. Gerbershagen said the last week experiment was completed and a new experiment was installed and running since Friday. As they are working with a small number of bunches, it will not affect the NA physics.

LHC

S. Redaelli said that the LHC almost recovered normal operation. As they are still ahead of physics production schedule, they will try to optimize the peak performance in the following week. Some clean-up of the injection steering should be coordinated with the SPS.

Concerning the steering, **K. Cornelis** commented that due to high temperatures, some magnets are at the limit of regulation and the situation should calm down in the coming days with more reasonable weather.

TI

There was no report.

3. Report on recent PS RF issues.

W. Hofle reported on the PS LLRF issue after the power cut of 28/07/2018 ([Annex 9](#)).

The sequence of events was detailed:

During the power cut on Saturday a week ago, RF equipment went down. Some LLRF modules are partially powered by UPS but it is not clear if the UPS went down as well in the PS central building. As a consequence, C40-77 and C80-89 could not be restarted and C10-76 was not pulsing. Piquet and experts were called and the LLRF Piquet was called to restart the transverse feedback in the PS and in the PSB. On Sunday afternoon, a LHC INDIV beam was back in the PS. Unfortunately, during the following night, the 20 MHz (used for splitting) was not pulsing, as well as 40 and 80 MHz on multi-bunch beams. On Monday, the source of excessive noise on the loop could not be located and a timing (PAX.SSWH84REF) was erroneously enabled on the 48 bunch cycle switching to an incorrect reference clock which complicated the later investigations. The error of the enabled timing was only realized on Wednesday morning, when all settings were compared with different previously working 48 bunch cycles. By Wednesday morning, the 48 bunches were available in acceptable quality by correcting the timing incorrectly set on Monday and by advancing the switch-over between the phase-loop from the 10 MHz to the 20 MHz. Finally, it was found yesterday that the mixer converting the 10 MHz cavity return sum to IF (21.4 MHz) had a faulty channel. Switching to a spare channel permitted to roll back the phase loop gain and timing for phase loop switch-over. It is supposed that the faulty channel was damaged during the power cut.



The downtime could have been reduced by:

- Reviewing the UPS and electrical distribution for critical equipment (scheduled for LS2).
- Availability of a tool to compare the settings with the old “Varilog” functionality.
- Systematic storage of reference settings.
- Availability of trained experts.

V. Kain mentioned that a new generation of the reference setting/measurement tools is being developed. New requirements (e.g. Varilog functionality) should be incorporated. This feedback will be communicated to the settings management working group and the operators working on reference measurements.

4. Awake run#2 report.

E. Gschwendtner reported on the AWAKE July run ([Annex 10](#)).

After the first demonstration of electron acceleration in a proton-beam driven plasma during the May run, the July run was dedicated to the optimization of the electron charge capture by plasma wakefield and the characterization of the accelerated electron beam.

AWAKE took protons during weeks 27-28 but there were unfortunately many issues to be sorted out that did not permit to achieve the July run goals. There are nevertheless many lessons learnt from this run, especially that the protons beam parameters should be checked at the beginning of a run. The colleagues who operated the machine also gained a lot of expertise in debugging the machine.

5. Schedule update.

V. Kain presented the [injector schedule](#) (version 1.6).

HiRadMat is running this week. There is a dedicated MD in the SPS tomorrow.

6. AOB

There was no AOB.

Next Meeting: Tuesday 14th August 2018.

Minutes reported by [JB. Lallement](#) on 7th August.



Summary of the 25th FOM Meeting

Held on Tuesday 14th August 2018

Agenda <https://indico.cern.ch/event/749304/>

- 1. Follow up the last FOM*
- 2. Special operational issues during the weekend*
- 3. Schedule updates*
- 4. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 24th FOM](#) were approved, noting the comment from **E. Amarilla Garcia** that the PSB MPS cooling problems mentioned in last week's minutes were not due to the cooling water supply, but due to some failed fans related to the main quadrupole active filters, which are under TE-EPC responsibility (see PSB report this FOM).

No follow-ups were reported.

Linac2 & Linac3

G. Bellodi reported on the linacs ([Annex 1](#)).

Linac2

The week for Linac2 was not very good. Breakdowns of LI.CBU01 buncher cavity started on Friday (10th of August) and became more and more frequent. The cavity amplitude dropped to zero, the RF pulses were affected and were fully reflected back to the amplifier causing a loss of transmission. The RF team was called in at midnight on Friday (10th of August). The Franck James amplifier was tested, all HV connections were checked, and the cavity was tested. No indication of a problem was discovered. The investigations lasted until Saturday (11th of August) 19h30, but were not conclusive. The problem disappeared suddenly at 01h00 on Sunday (12th of August) morning, and a normal performance was recovered. In the aftermath, the cavity was being kept monitored and a list of additional tests had been discussed in case the problem reoccurs.

Linac3

A quiet week for Linac3 was reported. Stable operation was achieved throughout the week with an average current of ~25 uA. The operation is stopped now for the scheduled repair works on the GTS extraction system.



LEIR

N. Biancacci reported on LEIR ([Annex 2](#)).

The only major issue was a replacement of the driver 2 power supply of the CRF41 (1 every 10y fault). The TFB showed recurrent faults on the cooling flow-meter and an investigation was carried out. There was an access planned for this week (w33). On the MD side, there was progress on the h2+4+6 beam and the h3+6 was sent to PS. A transmission to PS of 96% was reported.

A. Findlay said that the parts for the TFB were delivered and the intervention would take place at the end of the week.

PSB

A. Findlay reported on the PSB ([Annex 3](#)).

The PSB had a good week. The downtime was entirely dominated by the L2 issues, outside of this only 1.2h downtime was reported. Nothing else significant was to be said. On Friday (10th of August) **F. Boattini** confirmed that the cooling problem, which was limiting the number of cycles in the PSB, had been identified as the cooling fans for the Quad active filter racks not being on. These were checked then put back into operation, and the problem was thought to be resolved. The Finemet cavity reliability run was started on the ISOLDE users, replacing the 2nd harmonic C04 system on Ring 4. A request for an MD cycle with an intermediate FT prompted **J.M. Nonglaton, Y. Wu** and **G.P. Di Giovanni** to revive the 1 GeV cycle in the PSB. Although this hadn't been done for many years, they soon had a beam accelerated up to 1 GeV, and the cycle was now ready for synchronization and extraction setting up. The R2 occasional loss with higher intensities is still an issue; nevertheless, TOF production has returned from R3 to R2.

B. Mikulec asked why the PS was preferring the TOF beam to be produced from PSB R2.

A. Findlay replied that there were high losses at extraction in the PS with bunches coming from PSB R3. The situation was not fully understood. The higher intensity and the occasional losses of R2 are preferred instead of the regular losses and the lower intensity of R3.

ISOLDE

E. Matli reported on ISOLDE ([Annex 4](#)).

ISOLDE had a good week. 106Sn at 4.4 MeV/u was sent to Miniball from HRS. On Saturday (11th of August) a 12h downtime caused by the Linac2 issue was reported. About 1h total downtime was caused by RF trips and another 3h downtime was caused by RILIS shutter problems.

The GPS target failed and was replaced on Monday (13th of August). 12C4+ was delivered to the scattering chamber at 4.9MeV/u. The B run preparation was ongoing.

ISOLDE Users

K. Johnston reported for the ISOLDE Users.



It was a successful week at ISOLDE for the users. The experiment which was running was Coulomb excitation of ^{106}Sn at Miniball. In spite of the proton downtime over the weekend and a few required interventions to maintain the yield, the beam was excellent with twice the statistics obtained than had been requested in the original proposal. The experiment was able to complete its planned programme.

PS

K. Hanke reported on the status of the PS ([Annex 5](#)).

On the PS side, there were only a few resets and reboots. The RF piquet (HL and LL) had to intervene a few times. The F16.QDE217 tripped several times before it could be repaired permanently. For three days C40-77 was not working and the PS was running without spare. Only 40-78 was in use, but finally the power supply could be fixed. During the weekend (w32) there was a 3h and 8:37h stop (total 12h stop) and a long period of degraded operation (~24h) due to Linac2. Sunday (12th of August) morning at 1:00 the Linac2 returned to normal performance. The LHC did not suffer too much from the low-quality beams.

The ToF performance was still above the predictions, but the slope slightly decreased.

The known water leak in the PS was increasing and EN-CV was asking for an intervention.

B. Mikulec added that since there was another request by **R. Froeschl** for the TT2 power supply of the radiation monitors, it should be discussed in the schedule update.

East Area

There was nothing special to report.

East Area Users

H. Wilkens reported on the status of the East Area Users.

It was a good week for the users. The P349 (anti proton polarization) experiment will end tomorrow (15th of August) and the beam test works for the PANDAS experiment. Therefore, the number of cycles to the North Branch can be reduced.

nToF

M. Barbagallo reported on nToF.

The run of the first experiment was smooth in the last two weeks. The second experiment showed just a problem with the neutron beam monitors, which was fixed within one hour.

AD-ELENA

L. Ponce reported on AD and ELENA.

AD



The e-cooler intervention was completed on Friday (3rd of August) and conditioning was done over the weekend (w31). The vacuum valves were opened on Tuesday (7th of August) morning. The first extraction was back on Wednesday (8th of August) in the afternoon. Some fine tuning of the e-cooler and the rest of the machine all was done on the weekend (w32). The average extracted intensity was finally back to levels before the e-cooler intervention, but it was still lower than optimal performance of beginning of June. The limitation of intensity on the target was still in place, as the leak was back since beam was back.

B. Mikulec asked when the last water refill took place.

L. Ponce said that the last refill was at the end of June. Since Friday (10th of August) three refills had to be done.

B. Mikulec asked if this was already at a critical level.

The conclusion was to observe the situation carefully.

ELENA

T. Eriksson said that ELENA was progressing. The beam is delivered to GBAR. Minor issues were under investigation. The largest among them is the elimination of the losses at the lowest ramp. Also, a better working point and the study of chromaticity was part of them. The cooling performance was being studied and a jitter problem for the extraction had to be resolved.

An earlier statement of deceleration of the H⁻ from 100 keV to a few keV at GBAR was revoked.

AD/ELENA Users

H. Wilkens reported on the users.

ATRAP was off since last week (w32) and was cooling down. Now GBAR and AEGIS were running.

SPS

V. Kain reported on the status of the SPS ([Annex 6](#)).

The availability was 82% caused mainly by Linac2. Other issues were various power converter problems. The FGC function clean during re-mapping was not working and hence unwanted functions were played for unused power converters. This led to beam losses at injection. It explained several issues over the last months and it will be followed up. A vacuum leak occurred at the 312-pressure sensor and had to be repaired. It was not directly affected by the glitch on Saturday (28th of July).

The impact of the RF gymnastics on the slow extraction was investigated during an MD on Wednesday (8th of August). An issue with the radial steering knob in LSA was understood. As a consequence, the measurement of the chromaticity was not correct so far and will be corrected. Also, a new software is available to measure the momentum distribution online for the slow extraction.

The HiRadMat experiment 37 was successfully finished last week (w32). The new HiRadMat optics (4 mm, focal point 3) was commissioned by the HiRadMat team. The "Short" HiRadMat cycle is required for further set-up. For the low intensity it was fine, but for high intensity there was still work to be done.



North Area

B. Rae reported no major issues except for a downtime of 3h on Monday (13th of August).

North Area Users

H. Wilkens reported on the North Area Users.

It was a very good week for the experiments. There was an average of 4000 cycles per day.

AWAKE

There was no report.

CLEAR

There was no report.

LHC

E. Metral reported on the LHC.

The week was quiet for the LHC. It was reasonable, but not the best production week, as interruptions for accesses (EPC, QPS, MKI, BIS) and a bad Saturday for LINAC2 decreased the performance. The production follows now closely the predicted performance with just over 4 fb⁻¹.

TI

Nothing special to report.

2. Schedule updates

B. Mikulec presented the injector schedule ([version 1.6](#)).

There was the request to search for the water leak for 2h in the PS. There was also a 2h request of the RF team, in parallel to the leak search. Additionally, there was the necessity of an access for 0.5h in TT2 for the radiation monitors.

K. Hanke mentioned that there was a risk for the East Area due to a possible cooling stop during the 2h RF request.

M.E. Amarilla explained that the power converters in 365 would be filled. It was a different circuit than for the PS, which is connected to the East Area. There was the possibility to do it in parallel to the PS access.

H. Bartosik said there was a dedicated MD in the PS on Wednesday (15th of August) on resonance excitation, which means that there is no beam for the PS users from 8h00 to 18h00, except during the filling time of the SPS for the COAST beam. The PSB is not affected.



B. Mikulec added that the only user, which were not affected, were the ISOLDE users.

It was agreed on setting up the access to Thursday at 8:00 (16th of August), since there was the MD on Wednesday (15th of August). Doing the access in the morning provided sufficient spare time and expert presence in case of need. The precise final hour has to be checked with the LHC filling schedule if it would be feasible.

After the meeting B. Mikulec sent around an email informing everybody that the beam stop would already happen on Thursday at 7:30 due to the required radiation cool-down. ISOLDE would also be affected during ~1h, as the leak search includes the Switchyard.

3. AOB

A. Bland reported a minor security leak concerning the CPSOP password. It was decided by the CERN security team to change the passwords.

The password change will occur at 9h00 Tuesday, 18th of September (during ITS2).

Here is the list of affected users:

1. adeop
2. cpsaces
3. cpsop
4. deskpsb
5. elenaop
6. leiop
7. linop
8. ln3op
9. ln4op
10. mcrop
11. psbop

Minutes reported by [S. Hirlander](#) on 16th August.



Summary of the 26th FOM Meeting

Held on Tuesday 21st August 2018

Agenda <https://indico.cern.ch/event/750833/>

- 1. Follow up the last FOM*
- 2. Schedule updates*
- 3. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 25th FOM](#) were approved.

There will be a meeting organized by **V. Kain** with EPC, OP and the INCA team concerning the open problems of the controls of the FGCs. Input of other OP sections would be appreciated to get a complete list of all encountered issues.

At the end of this meeting there was a detailed report on the power glitches and major events planned.

Linac2 & Linac3

D. Kuechler reported on the linacs ([Annex 1](#)).

Linac2

The week for Linac2 was very good. On Friday, there was the request to stop the beam because one of the frontends was affected by the power glitches during the week (w33) and had to be replaced.

Linac3

The source extraction system was repaired as scheduled. The beam was back on Thursday (16th of August) at midday, which was 1.5 days ahead of the scheduled time. So far it looks like a success, meaning less high voltage breakdowns and less limitation in the tuning range. The source vacuum system stopped twice due to the power glitches, which is problematic with the hot oven.

J. Nielson asked if power glitches are leading to such problems.

D. Kuechler answered that the UPC was affected and consequently the vacuum was lost, which is exceptional and usually not the case.

Linac4

B. Mikulec reported on Linac4.



The DSO tests were finished successfully last Friday (17 of August) and now the hardware was being commissioned.

LEIR

M.E. Angoletta reported on LEIR ([Annex 2](#)).

It was a quiet week for LEIR. Initially there was no beam expected before Friday (17th of August). The beam was back on Thursday (16th of August), but due to the power glitch, LEIR was not ready to take the beam. Several power supplies tripped and it took from Friday (17th of August) till Monday (20th of August) to recover, because the expert was not available earlier. In addition, there was a problem with the TFB, which was solved by a manual reset on site. After this LEIR recovered almost immediately. The h3+6 was ready to be sent to PS and SPS.

PSB

F. Antoniou reported on the PSB ([Annex 3](#)).

It was not a very nice week for the PSB with an availability of 84.8%, corresponding to a total downtime of 25.4h. On Wednesday (15th of August) afternoon at 17h40 a power glitch due to an intervention of EN-EL in 4 UPS tripped most of the PSB systems. At 20:52 the beam was back in R1/2/3 while R4 was still suffering from an RF problem until 21h25. Due to a timing fault, the ISOLDE request could not be seen by the external condition until 00h44. On Thursday (16th of August) morning the beam was cut at 07h40 for a PS intervention. During this time, some shadow interventions also took place in the PSB. The beam was back at 09h42. In the afternoon, there was another electrical network issue. ME4 and ME6 tripped during the restart of POPS and all the Meyrin site was down. Once more most of the PSB systems tripped. The beam was back at 01h23. During the week, several trips of the recombination kicker BT1.KFA10 occurred. The TE-ABT experts asked for an intervention on ring 1 of at least 4h on the BT1.KFA10 tube, as it was very unstable. The intervention was finally scheduled on Friday (17th of August) morning starting at 11:30. Due to a problem with the hydraulic system after changing the tube, the intervention lasted finally for 8h.

The MDs included tune scans, wire scanner setting optimization, PS WS vs PSB SEM grid checks, setting up of 1 GeV cycle, Finemet cavity setting-up, K-scan in BTM line and improving the injection efficiency for ISOLDE.

E. Fadakis mentioned that the external condition FEC is not in Diamond for ISOLDE. If it would have been visible, the issue with the ISOLDE request would have been much easier to understand. The question is if this could be added.

M. Gourber-Pace replied that these racks did not restart properly because of the UPS. The FEC is very critical handling all the standard timings and external conditions. In order to avoid any remote resets, it has not been added to the diamond configurations. Also, it was not clear if the error would have been displayed as such since it depends on the fault and after a restart it is not likely to be in any fault status. It has to be discussed how the machines get warned.

ISOLDE



E. Fadakis reported on ISOLDE ([Annex 4](#)).

The good news was that world's first post acceleration of 8B in ISOLDE took place. The users took 8B3+ at 4.9 MeV/u, from GPS to XT03 (scattering chamber). A very low production of the desired isotope was achieved. The two consecutive power glitches caused a significant downtime. The low target yield was slightly compensated by receiving up to 2.5 uA of proton beam.

ISOLDE Users

K. Johnston reported for the ISOLDE Users.

It was a challenging week at ISOLDE for physics (and everybody else). The aim of the experiment was reaction studies of 8B, which is already one of the more difficult beams for ISOLDE to produce. The original target failed before the run started, which meant that a backup (but old) target had to be used instead. This produced lower yields than desired, but the experiment decided to run in any case. The two electrical glitches resulted in quite some downtime, but by Friday the running conditions were stable. This was the lightest beam yet taken through HIE-ISOLDE and the first time that 8B has been post-accelerated worldwide.

In the end, preliminary data were taken, which are low in statistics but should allow at least some aspects of the experimental programme to be fulfilled, but the users will need to come back after LS2 to complete the study. The users wish to thank the operations team and especially **E. Fadakis** for all the efforts in delivering the beam and recovering stable running after the two electrical interruptions.

PS

A. Guerrero reported on the status of the PS ([Annex 5](#)).

The PS was down for 32 hours from Wednesday (15th of August) afternoon till Friday (17th of August) at 4h00, then with issues due to frequent trips of the PFWs until 11h00 and finally running with beams affected by the missing booster R1 until 19h30 on Friday (17th of August).

Around 17h30 on Wednesday (17th of August) all FECs started rebooting. This was the start of a 12h beam stop due to an electrical distribution problem apparently originated from an intervention on a UPS battery. The first beam recuperated was EAST at 1h30. All beams were back at 5h30 after solving many issues:

- Most of the FECs lost the communication with the equipment including POPS FGCs. TI could not reset the 18 kV cells anymore and the piquet EN-EL had to intervene once a star point had been fixed by IT specialist.
- It was not until all RF FECs were rebooted after the fix of the SP that all beam controls started working and all beams could be played. The 256h clock was distributed to the beam control HW and it is connected to the UPS network. The FECs which started without seeing the clock distribution could not work.
- Once POPS restarted, the B-train was not received anymore. Both new B-train systems were in fault, M. Buzio tried to put the system back in place, but finally the cycling was restored by switching to the old B-train until the next morning when the systems were fixed.
- The FEC of the injection kicker kfa45 did not come back either and ABT had to intervene, too. Finally, CO solved the issue. The configuration of the fan had been lost.



- The PIPO and the EPC CO expert were also busy to recover other equipment that did not reset. The IT specialist was called again for a communication problem in building 269 affecting the injection septum and all TT2 line equipment. The FECs in 269 had to be rebooted again after the intervention to recover.
 - First Line was called for ZT10.QFO02. A big intervention was needed to exchange the MCB.
 - The CO timing expert was called for the SMH16 timing missing. Two problems were identified: the Ethernet network speed and the forewarning timing were missing in cycles with a preceding 1BP cycle. Two hours later, at 7h30, a programmed stop to search for a water leak in the PS ring and agreed at the FOM took place. The visit started in the Switchyard to minimize the stop time for PSB. The leak was found in MU57, a very hot place situated next to the EAST extraction septum. The magnet expert informed that a restart of the machine without fixing the leak would risk the magnet integrity. The magnet team could only start the first inspection at 13h00. Then they managed to repair the leak by 17h30 and the recovery of the machine started. The total downtime was of 10.5 hours. While switching back POPS on, the PIPO was forced to press the AUG in building 355 producing again a cut of a large part of PS and PSB equipment. When they were starting one of the 18 kV cells, again they could see that the command on/off was being sent continuously. The recovery was finished by midnight requiring 6 hours:
 - Intervention of PIHLRF for the auto-tuning of C40 and C80 and for the 200 MHz cavities
 - Intervention of IT in SPS of buildings 132 199 and 400
 - Intervention of PI Kicker for kfa45 FEC again and to restart the MTE kickers.
 - SMH57 in external fault, specialist called
 - PIVAC started the vacuum in booster and PS
 - PILLRF came due to a water issue in the transverse feedback. The problem was solved by the operators by switching on/off each control.
 - Firstline intervened on ZT11.QFO04 to change a 24V power supply
 - Once POPS was back the PIPO restarted PR.QFNO5, PR.QFNO95 and F16.QFO225S. A check on a communication problem with F16.QDE163, F16.QDE210 and F16.QFO215 was done. Finally, a restart of PR.XNO55 was required.
 - The EN-STI piquet worked on TDI48, it was not in nor out staying in a busy status.
 - A restart of the central timing gateway caused everything to be back to red for a few minutes!
 - The CO specialist called for two OASIS FECs, one had to be restarted locally.
 - Other instrumentation FECs had to be restarted locally.
- Once PS was ready, one had to wait for Linac2 to be back. All beams except LHC beams were back at 2h00. One C40 and one C80 were not pulsing and the PIHLRF was called again and at 4h00 LHC beams were also back. However, the problems did not end here, as the SMH16 did not pulse for the LHC4 user. After some investigation, it turned out that the forewarning was firing 1s in advance. On top of this from around 4h00 the PFW started tripping very often (each 15 to 20 min) producing large losses and alarms. The MTE intensity was reduced by 1/3. The issue was tracked to the PFW FGC gateway "cfc-355-rps3", which prevented the PFWs to pulse during 1 minute, and was solved at 11h00 by CO. The Ethernet card of the gateway was restarting with a connection of 10 MHz instead of 100 MHz, so the queue was piling up the notifications until it crashed. During Friday (17th of August) other non-critical issues risen from the electrical distribution cuts were solved.



This week (w33) there was a dedicated MD on Wednesday (15th of August) that started with a search for the sextupolar interaction with the beam that needs compensation and ended with injection Semgrid tests.

K. Hanke asked how the decisions should be made, if there is a user conflict. Which user has priority over the other when distributing the available cycles.

On the weekend both experiments, nToF and ISOLDE, needed as much beam as possible for statistics.

B. Mikulec said, in the case when users request an increased number of cycles compared to the nominal supercycle composition, the physics coordinators should take the decision. The last weekend the nominal share was applied, and in addition, the operators were made aware of making maximum usage of all cycles in the supercycle for the two experiments.

East Area

There was nothing special to report (**B. Rae**).

East Area Users

H. Wilkens reported on the status of the East Area Users.

Last Wednesday (17th of August) several installations took place, limiting the performance.

nToF

M. Barbagallo reported on nToF.

Taking as much as possible statistics was now ongoing. There was an intervention planned, which does not affect the beam. A short operation of a couple of hours was also planned.

AD-ELENA

L. Bojtar reported on AD and ELENA.

AD

The AD had a difficult week like the other machines due to various problems ([Annex 6](#)). On Tuesday (14th of August) during the PS access, tests were performed on the thermal stability of ring power supplies. Also, a new notch filter for the stochastic cooling was made nearly operational by the RF people, which was still under testing. Lots of troubles were seen restarting the AD after the power glitch. Many front-ends went down and had to be restarted. There were no timing events in the AD, first the central timing was suspected, but it turned out to be a problem with the beam request server. After restarting that server, timing was available in most of the machine. The FTA.9000 line still didn't have timings. After a CPU card had been replaced in a timing front-end the timings were back. This seemed to be a configuration problem rather than a HW one and will be followed up by the controls group. The electron cooler had an interlock due to a bad water level sensor, which had been bypassed by the specialists as a temporary solution. The DR.QUAD-MAIN1 power supply didn't start up. It took 6 hours for the FL to fix it. After fixing all this, beam was back in the AD, but the intensity was low partially due to a missing booster ring. Mainly



adjustments were needed in the AD (33% efficiency). It has been improved a lot to about 70 % efficiency, but this was still lower than the usual performance, which would be about 80 %. Particularly the cooling performance at 300 MeV/c and the recapture needs improvement.

ELENA

T. Eriksson said the intention was to take PBars during the week (w33), which was not possible due to the situation. On the weekend (w33) the PBars could be taken and beam with very low intensity was sent to the GBAR experiment. At the moment, there are no PBars due to the physics program.

AD/ELENA Users

H. Wilkens reported on the users.

The ATRAP experiment is back online since Thursday (16th of August). There was very little beam overall except for Friday (17th of August).

SPS

V. Kain reported on the status of the SPS ([Annex 7](#)).

The SPS had a good week. The main problems were coming from the injectors. No major issues were reported concerning the SPS. A successful insertion of the diffuser was reported, which is part of the loss reduction campaign for the slow extraction at the SPS for the LS2 era. The diffuser mimics the ZS (the electrostatic septum) and reduces the losses by scattering. There was a short issue due to losses on the BLMs associated to QDA.219, which was solved by a tune trim in the vertical plane. The LHC beam showed no problems.

The SPS had a vacuum leak (in 331 – left-over vertical aperture restriction) due to a hole in the chamber since Monday evening (20th of August). The magnet was being exchanged and afterwards it has to be scrubbed again and normal operation is expected on Wednesday (22nd of August) midday. Then the LHC beam will have to be recommissioned. The leak was caused by an excitation due to a half integer resonance in the vertical plane (wrong trim). There is no safety system in the SPS to avoid such problems. The hole was created within one turn.

B. Mikulec asked about the plans for the diffuser.

V. Kain answered that it was a very successful test. The diffuser will be replaced by a crystal, which should result in even higher loss reduction.

M. Fraser added that it will be replaced during the next technical stop and is for the moment foreseen to be used exclusively for MDs.

North Area

B. Rae mentioned DSO tests on the H4 extension line.

North Area Users

H. Wilkens reported on the North Area Users.



It was difficult for the test beam users. The issues on Wednesday (15th of August) costed 3.5 days of beam time.

AWAKE

S. Gessner reported that beam will be taken next Thursday (30th of August) and before a check of the equipment is planned.

CLEAR

There was no report.

LHC

E. Bravin reported on the LHC.

The LHC had a good week. Until Monday (20th of August) afternoon the LHC was back in production. For Wednesday (22nd of August) the SPS will be scrubbing and afterwards the LHC will be filled. The team tries to find a suitable activity for this time.

TI

J. Nielsen reported on TI ([Annex 8](#)).

A very eventful week with water leaks, electrical glitches on the 400 kV, but also on the UPS and the activation of the AUG in POPS was reported.

Report on the PS Complex Major Events by EN-EL

B. Jedrej reported on the PS Complex major events during the week (w33) ([Annex 9](#)).

In ME6 there are two UPS redundant in parallel and as long as one UPS is on, the protection is active. The UPS are 20 years old. Since July one of the UPS was shutting down from time to time- but the fault is fugitive. It happened four to five times. An intervention after a shut down last week pointed to an AUG (electrically activated), which needs to be understood. This led to a four second power cut on an electrical switchboard (EOD1*6S). The UPS were restarted and are online without fault. During the next technical stop the case will be further investigated.

B. Mikulec asked if the fault was understood.

B. Jedrej said that he tried to eliminate the causes on his level, but the exact reason for this was not identified.

B. Mikulec summarized that two things had to be followed up. First to understand the fault of the UPS 12 and the second is to understand why the AUG button was activated.

D. Ribiollet reported that on Wednesday (16th of August) at 18h09 the EUB3*6_6R AUG was actioned by an operator. The details of the investigation can be found in ([Annex 9](#)).

X. Genillon sent a summary of the different steps of the piquet intervention to clarify the happenings:

- The PIPO was called to unlock the 18 kV cells for POPS



-
- The PIPO made a mistake in the procedure and put the cell in a bad state, which provoked multiple ON/OFF sequences of the cell (but the cell was not inserted in the 18 kV network).
 - The PIPO pushed the AUG to stop the cell behaviour. However, this behaviour was normal and caused by the bad manipulation of the 18 kV cell.
- To avoid to have this kind of problem again, TE-EPC will improve the PIPO formation for this equipment.

2. Schedule updates

B. Mikulec presented the injector schedule ([version 1.6](#)).

The planned dedicated MD for the SPS was canceled due to the current situation of the SPS. The other MDs are parallel in PSB and PS. AWAKE starts Thursday (30th of August) next week.

IMPACTs for planned activities during the next technical stop should be sent. **D. Mcfarlan** mentioned that the full duration of 30h hours will be needed for the SPS, since some sectors will be vented. There will be presentations on the 4th and 11th of September of the planned interventions.

3. AOB

Two access points were announced for maintenance concerning the nToF target area:

YEA01.TFT=802 and **YEA02.TFT=801** (cooling zone) will be on maintenance on **Wednesday, 22nd of August 08h30** till **Friday 24th of August 17h00** ([Annex 10](#)).

This has been confirmed by RP.

M. Barbagallo said that they would need access if there is a stop of the beam to the experimental area for about two hours.

B. Mikulec said that in such a case **D. Chapuis** would have to be contacted to put the doors into normal access mode.

Minutes reported by [S. Hirlander](#) on 22nd August.



Summary of the 27th FOM Meeting

Held on Tuesday 28th August 2018

Agenda <https://indico.cern.ch/event/752357/>

1. *Follow up the last FOM*
2. *Schedule updates*
3. *AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 26th FOM](#) were approved.

Linac2 & Linac3

R. Wegner reported on the linacs ([Annex 1](#)).

Linac2

Linac2 was running very well. The only issue was a sudden failure of the tube in the Debuncher DB10 amplifier last Monday. It was repaired within less than 2 hours.

Linac3

Linac3 was running very well. On Monday, the source was difficult to control, but became more and more stable. The beam intensity was about 30 uA thanks to **D. K \ddot{u} chler's** frequent re-tuning. Excellent running over the weekend.

Linac4

B. Mikulec reported on Linac4.

The second week of HW commissioning has started. All activities are going well. The source cesiation on Monday (27th of August) showed some problems and requires some follow-ups. The 3 MeV beam commissioning is planned to start on Friday (31st of August).

LEIR

M.E. Angoletta reported on LEIR ([Annex 2](#)).



LEIR had a good week. From Monday (20th of August) onwards the h=3+6 beam was available for all users. Instability and cooling force MDs were performed. The h=2+4+6 setup continued. A stable and homogenous injection of 12E10 accumulated intensity was achieved.

PSB

S. Albright reported on PSB ([Annex 3](#)).

PSB had a very quiet week with a little over 2 hours down time or 98.7% availability. The longest stop (1 hour 47 minutes) was the Linac2 intervention on Monday (27th of August) morning, about 30 minutes otherwise. During the Linac2 stop there were interventions on BE.BSW14L4, BTM.BPM10 and a ring BLM. Otherwise there were a few minor fixes and stops, as well as the usual large number and variety of MDs.

ISOLDE

S. Mataguez reported on ISOLDE ([Annex 4](#)).

On GPS, Tuesday (21st of August), IS616 stopped taking data on 8B and took 12C beam early morning. A new target was installed on Friday (24th of August) morning. On REX-EBIS, the degrading EBIS cathode has been replaced on Tuesday (21st of August), immediately after pumping started. Several technical interventions were performed in parallel. The tape station has been repaired on Tuesday (21st of August) but broke again on Wednesday (22nd of August) during the proton scan - a new intervention has to be planned. On HRS, on Wednesday (22nd of August), a stable beam 120Sn was delivered through separator and RFQ (cooler/buncher) (Bunching mode) with a very good transmission setup, but the optics had to be adapted several times (without reason). When CRIS users tried to switch to 104Sn, Thursday (23rd of August) evening, beam stopped at the RFQ. On Friday (24th of August) evening 104S rates of ~1500 atom/s after the cooler could be delivered.

The transmission and stability across the RFQ require to be studied further and improved.

ISOLDE Users

K. Johnston reported by email for the ISOLDE Users.

Last week it was laser spectroscopy at ISOLDE: the CRIS experiment were measuring the ground state spins, charge radii and electromagnetic moments of neutron deficient Sn isotopes. Once the experiment got going properly on Friday very good data were taken with full data from 104-124Sn and initial measurements were possible of the poorly produced 103Sn. 104Sn – 107Sn were measured for the first time and the experiment will be able to address many questions on nuclear structure around the important 100Sn region.

The users are very satisfied with the run and would also like to thank the technical teams for all the efforts at the beginning of the run to set up the machine.

PS

H. Damerou reported on the status of the PS ([Annex 5](#)).

An average week for the PS with a beam availability above 93 %.

On Wednesday (22nd of August) morning a dedicated MD for the injection SEM grids was scheduled on short notice, in the shadow of the vacuum problem in the SPS, then affecting only



beams to AD and nTOF during 2h30. The beam synchronous trigger for the SEM grids now works correctly, but a further jitter with the (old) acquisition electronics is observed.

A first access on Friday (24st of August) morning to investigate a problem with the 40 MHz cavity (C40-78) revealed that an exchange of its final amplifier in the ring was required. Following a fill of the LHC with only one 40 MHz cavity, a second access was scheduled on Friday (24th of August) afternoon to finally repair C40-78. Both accesses stopped all beams for in total about 4h30. Later the same cavity was still troubled by a minor interlock problem, making it difficult to deliver LHC-type beam for HiRadMat for a further hour. During the night from Saturday to Sunday (25th -26th of August), all beams produced by the H8H16 beam control were not accelerated due a sudden change of phase loop offset, supposedly due to a bad contact. The phase loop offsets had to be corrected again later and are now back to initial values. Low intensity EAST beam has been delivered to Irrad, down to an intensity of only 3E9 p per spill. The 3-bunch lead ion beam with 75 ns spacing has been sent for the first time to the SPS for beam quality checks. Beam tests to produce two TOF bunches on a single cycle continued and in total about 1.5E13 ppp have been accelerated.

B. Mikulec asked if it was planned to use to two bunch TOF cycle this year.

H. Damerou answered that there were to many things, which still have to be sorted out. The aim is to advance with this study as far as possible.

East Area

There was nothing special to report (**B. Rae**).

East Area Users

H. Wilkens reported on the status of the East Area Users.

There was the demand for p355 users in T10 plus four seconds in-between East North cycles.

H. Damerou said that he will inform the operators to be aware of this.

R. Froeschl mentioned that since Wednesday (22nd of August), beam is taken to collect data to benchmark FLUKA with colleges from Japan. The availability was excellent and the flexibility of the operators was great.

nTOF

M. Barbagallo reported on nToF.

Sharing the beam with ISOLDE last week (w34) was working fine. This week nTOF requests the maximum available and from Thursday 8h30 (30th of August) on, there will be an on-off operation to change equipment and the experiment. It might be that the statistics will be recovered this week (w34). On Thursday (30th of August) sufficient data for the experiment might be collected.

M. Barbagallo said that on Thursday 8h30 (30th of August) for half a day the changes will be done and afterwards the beam is needed from time to time for tests until Friday (31st of August).

B. Mikulec summarized that ISOLDE was fine with the share of around 40% cycles and in the case, there would be free cycles, in accordance with the limits of the nTOF target, the number of protons delivered to nTOF should be maximized. From 3rd of September there will be normal



conditions and for special requests depending on the experiments, a discussion should be organised involving the physics coordinators for an arrangement.

AD-ELENA

B. Dupuy reported on AD and ELENA ([Annex 6](#)).

AD

AD had a chaotic week due to several problems on the cavity C02.

At the beginning of the week (w34) the beam intensity was unstable and much lower than the nominal level. Furthermore, the beam dimensions, transverse and longitudinal, were not stable. Between Tuesday (21st of August) and Thursday (23rd of August) many resets of the C02 cavity had been executed. The RF and EPC specialists had to intervene many times on site outside working hours. **A. Findlay** (BE-RF-FB), **A. Jibar** and **M. Haase** (BE-RF-IS) have worked on glitches, which were visible on the cavity voltage at capture of the 3.5 GeV/c and 300 MeV/c processes. These glitches were also present on the phase loop. The consequence of these glitches was that the beam was poorly cooled by the electron cooling at 300 and 100 MeV/c, but it was more critical that the tune power supply dropped out from time to time and its start-up was no longer guaranteed. **A. Jibar**, **C. Oliviera** (BE-RF-CS) and **C. Machado** (TE-EPC-FPC) have worked on the tune power supply. The restart was very difficult after a sudden stop of C02.

This issue seemed to be fixed on Friday (24th of August) after a hardware board replacement by **C. Machado**. **A. Findlay** had adjusted the low-level process at all energies (3.5 GeV/c, 2 GeV/c, 300 MeV/c and 100 MeV/c). The bunch rotation at extraction was also adjusted, because the high-level action to minimising the glitch introduced a time-rise limitation during the bunch rotation just before the extraction. Noise on the voltage and the phase of the C02 was still randomly present, but the low-level and high-level settings minimised the disturbance on the beam.

Many energy adjustments of the electron cooler and electron beam steering have been done to improve the quality of the 100 MeV/c process. The electron cooling process at 300 MeV/c needed to be improved.

Other equipment (DR.SMI5306, DR.BHZTR20.21, stochastic cooling amplifiers) have required minor interventions or a reset. The bunch intensity was around $3.0E7$ antiprotons at extraction and the bunch length was lower than 180 ns.

ELENA

In collaboration with the AD experiments and AD operations the AD schedule was revised with the aim to optimise the commissioning of the ELENA machine and to maximise the available beam time with p-bars in ELENA with the equipment group experts support.

AD/ELENA Users

H. Wilkens reported on the users.

There was a new AD user schedule to optimize the beam time for GBar to the working hours. This was done to have the experts available.

SPS



K. Li reported on the status of the SPS ([Annex 7](#)).

It was a bad week for the SPS with a machine availability reaching only about 60%.

Monday (20th of August) started with FT and 2 MDs in the cycle. The LHC was in the middle of a fill and HiRadMat had an access to prepare their experiment. Towards the evening, the losses on QDA.219 on the fixed target cycle had returned and the 50 MHz compensation was very unstable. During the optimization of the working point (to solve the problem), an accidental trim happened that put the beam on the vertical half integer resonance, causing a fast blow-up and beam induced losses in one of the known aperture restrictions around MBB.331. Almost the full fixed target beam was lost over a period of about 15 ms - still below the BLM response time of 20 ms. Thus, the beam was not dumped and cut a hole into the vacuum pipe of the magnet. Monday (20th of August) evening was spent diagnosing the error and preparing everything for the magnet exchange. Monday (20th of August) night the machine was left to cool down.

Tuesday (21st of August), the MBB.33130 dipole magnet was exchanged. The vacuum connections were made and the alignment was done. The vented sectors were left pumping overnight. In addition, there had also been a rather large water leak in one of the magnets of BA81, which however could be repaired. Brazing of the busbar jumper was done one Wednesday (22nd of August) early morning. Pumping continued during the day with vacuum pressures descending only very slowly. By the evening, everything had been put back into place and the first beam was injected around 17h00. Due to the poor vacuum LHC got only PILOT and INDIV bunches. A dedicated scrubbing was done overnight from Wednesday to Thursday (22nd – 23rd of August). The initial intensity ramp-up went very slowly with high vacuum levels at low beam intensities. By Thursday (23rd of August) morning 72 bunches were reached. The intensity ramp-up was then accelerated and the nominal LHC filling was possible by noon. The beam quality was relatively good, but some TL steering was needed after the MBB exchange.

On Thursday (23rd of August), just before 17h00 both modules of the ADTH tripped on the SFT cycle just before reaching flat top. Fortunately, this time the beam was dumped by the faster LSS2 BLMs. Scrubbing continued on Thursday (23rd of August) during the day until about midnight - to improve the vacuum and ensure beam stability for LHC filling. This was partly done on the HiRadMat cycle and thus, at the same time, served as preparation for the HiRadMat run, which was supposed to take 288 bunches.

Friday (24th of August) there were issues with the PS cavities, which in combination with the still poor vacuum in the SPS led to vertical instabilities on the nominal LHC cycle (LHC1). For this reason, the chromaticity had to be increased by 0.15 units all along the cycle. With these settings, LHC could be filled stably. The PS cavities continued to pose problems, and in the afternoon an access of 3 hours was required for repairs. After LHC filling, which again went very well, and with the good evolution of the vacuum levels, the HiRadMat program could be finished as foreseen for this week (w34) during the night from Friday to Saturday (24th -25th of August).

On Saturday (25th of August) there was AWAKE taking beam during the day. The rest of the weekend was dedicated to fixed target physics. Very frequent interlocks on the SIS due to an MKD early enabled interlock signal were observed and quite heavily perturbed operation. This has appeared since a software upgrade on the FESA classes of the MKD, which was tried during the PS access on Friday (24th of August) and finally, however, rolled back to the previous version just



before taking back the beam. A temporary mitigation was found by rebooting the cfv-bal-mkdtrim FEC.

B. Mikulec asked if there were mitigations being investigated concerning the wrong trim, as mentioned on the machine protection meeting agenda.

K. Li answered that there were several topics to be discussed about this incident. On the software level, there will be maximum values added. Also, there will be a discussion on the improvement on the machine protection side on how to improve the situation.

North Area

B. Rae said that the DSO tests of the beam line on the H4 extension were cancelled due to problems. They were rescheduled to Tuesday (28th of August) morning, but since there is no beam, it might be done in the afternoon.

V. Kain said that there were slow extraction MDs planned for the afternoon, but this was delayed for the moment due to a cooling issue.

B. Mikulec asked if this was related to the issue with the water leak.

M.E. Amarilla replied that the work was currently ongoing, but it would take some time to refill the circuit, because the circuit was very big. The repair of the pipe, which took one day, was finished. Now it would be filled and had to be checked. The end was expected to be in the afternoon (Tuesday 28th of August). It would be confirmed.

V. Kain continued that for the planned MD the access conditions would have to be modified slightly. It would have to be checked if parallel works would be possible.

The discussion was to be continued after the meeting.

B. Rae said that once this would be finished, the set-up of the extension would continue.

North Area Users

H. Wilkens reported on the North Area Users.

It was not a good week for the fixed target users. 12000 cycles were accumulated during the week (w34). A superconducting magnet (in H8) tripped because a leak on a purge valve of the water cooling for the cryo compressors on Sunday (26th of August), causing ups and downs.

AWAKE

E. Gschwendtner reported on AWAKE.

The AWAKE run number 3 was started. Only on Saturday there was proton beam. Some problems with the beam position monitors in the beam line were reported. This week (w35) the refill of the Rubidium in the plasma cell will take place.

CLEAR

There was no report.

LHC

R. Steerenberg reported on the LHC.



LHC started to prepare the ion cycle for the end of the run in order not to be completely idle during the SPS magnet exchange. From Wednesday (29th of August) LHC will take some of the INDIV bunches, when the SPS was able to deliver. On fills when only one PS cavity was available, satellites were observed. After the 40 MHz cavity repair the LHC was running smoothly. The weekend was quite successful (w34) except for frequent and sometimes time-consuming injection beam line steering was still required.

TI

C. Pruneaux reported on TI ([Annex 8](#)).

A rather eventful week with water cooling issues for BA81 early in the week (w34) was reported. A small fire in SY5 on Saturday (25th of August) and a 220 kV glitch dumping the LHC beam on Sunday (26th of August) happened. Details:

<https://wikis.cern.ch/display/TIOP/2018/08/21/TI+Summary,+Week+34>.

M.E. Amarilla added that the parts concerning the cooling issue were really corroded and it took a long time to replace them. Currently there were big parts of the pipe being replaced. The cooling circuit had to be completely emptied. It was the circuit from the towers to the exchangers.

B. Mikulec inquired concerning the consolidation plan.

M.E. Amarilla said it was planned to change the cooling towers during LS2.

2. Schedule updates

B. Mikulec presented the injector schedule ([version 1.6](#)).

For the LHC MD3 block the beam requests for the injectors were needed.

R. Steerenberg said that the machine coordinators will present their plans on Wednesday (29th of August) at the LMC meeting.

B. Mikulec said that she will send the information of special beam requests to the machines after the LMC meeting.

Next week there will be special reports by the facility coordinators to prepare the technical stop.

The full duration will be needed, since the vacuum of the SPS has to be broken and a wire scanner in the PSB will be exchanged. There will be no beam until Thursday afternoon for any machine during the technical stop.

3. AOB

There was no AOB.

Minutes reported by [S. Hirilaender](#) on 30th August.



Summary of the 28th FOM Meeting

Held on Tuesday 4th September 2018

Agenda <https://indico.cern.ch/event/754480/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. ITS2 list of interventions*
- 4. Schedule update*
- 5. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 27th FOM](#) were approved.

2. Status of the machines.

Linac2 & Linac3

JB. Lallement reported the status of the linacs on behalf of **F. Di Lorenzo** ([Annex 1](#)).

Linac2 had a perfect week with 100% availability.

Linac3 had as well an excellent week. The first source oven was refilled on Thursday and new stripping foils were installed on the 4th arm of the stripper.

Linac4

B. Mikulec reported the status of Linac4.

The HW commissioning was completed and the RF commissioning above 3 MeV is on-going. The 3 MeV beam commissioning was started on Thursday one day ahead of schedule.

LEIR

R. Alemany presented the status of LEIR ([Annex 2](#)).

There were only few minor faults and the availability reached 99% (excluding the Linac3 oven refill). The new transfer line BPMs' information was efficiently used to improve the injection efficiency.



Strong perturbations of the stored intensity after injection were observed on Wednesday and Monday. They cured by themselves and might be due to PS remanent fields – to be followed up.

PSB

B. Mikulec reported on the PSB status ([Annex 3](#)).

It was a good week for the PSB with ~98% availability with the main issues related to RF cavities. On Wednesday night, the R1 C02 cavity tripped and a screen control unit had to be replaced (1 hour downtime). On Thursday night, Ring 3 C16 cavity tripped and wouldn't restart. The operator used transverse shaving instead to produce the LHC PROBE beam for the LHC filling. In the morning an access was given to replace a broken driver board in the machine as well as a filter for the current measurement on surface (1.5 hour downtime). During Friday night, the problem with Ring 3 C16 cavity reappeared and the RF piquet had to intervene and diagnosed a voltage limitation. It was solved on Monday morning (overload protection repaired) and the PSB ran in the meantime with reduced voltage on some users. In addition to the mentioned cavity issues the operators lost control over all machines Thursday afternoon. This problem was solved quickly by BE-CO. **A. Bland** mentioned that this problem will be analysed in depth to understand it and try to avoid it in the future.

ISOLDE

M. Lozano reported the status of ISOLDE ([Annex 4](#)).

It was a very good week for ISOLDE. GPS delivered 11Be ions at 7.5 MeV/u to XT03. Main downtime was due to some issue with RILIS.

ISOLDE Users

K. Johnston confirmed it was a good week for the users as well. The experiment was taking 11Be at 7.5MeV/u to a visiting chamber which directly images the radioactive decay of the isotope under investigation. The aim of the experiment was to detect beta-decay protons from the decay of 11Be and using delta-delayed alphas as a reference. The proton branching ratio is very weak, but the expectation was for about 1 million alpha events which was achieved, so it is expected that, once the analysis is done, the statistics are sufficient to be able to determine if the beta-protons are present or not.

PS

M. Fraser reported the status of the PS ([Annex 5](#)).

It was a good week for the PS with 95.5% availability, however, frequent trips of F16.QDE217's power converter have been a recurrent issue throughout the week and caused difficulty providing ion beam to the SPS. TE-EPC investigations identified a potential CO problem being now followed up. On Tuesday evening, it was decided to stop operation for an access when both vertical wire-scanners found themselves in undefined states causing 1.5 hour of downtime. On Thursday, KFA21 tripped requiring a piquet intervention and causing over an hour of downtime for SFTPRO. Operation was perturbed over the weekend by problems with the 10 MHz RF system. On Friday night, the gap relay on C76 broke and the spare C11 was put into operation, which caused reduced intensity for AD until



an access was made to fix the relay on Saturday at afternoon. The access caused 1 hour downtime. The AWAKE bunch was produced over the weekend with satellites being reported by the SPS that will need following-up. The LHC was filled last night with the LIU low chromaticity cycle to check the operational reliability of TFB.

B. Mikulec asked whether it was planned to continue running with the LIU low chromaticity cycle for the LHC. **M. Fraser** affirmed.

East Area

B. Rae said it was a good week apart from an issue with a not well connected radiation monitor that entailed an alarm and an access.

East Area Users

H. Wilkens said that the users were very happy with the large amount of cycles they received last week.

nToF

D. Macina said it was a very good week. The experiments in EAR2 will be changed tomorrow.

AD - ELENA

B. Lefort reported the status of AD ([Annex6](#)).

On Tuesday, a broken pipe on the AD roof created flooding in the power converter room. The roof was refurbished by SMB. On Wednesday, the PS operation was asked to lower the intensity to minimize the still present AD target leak. AEGIS lost their steering references on Saturday.

J. Nielsen mentioned that it might be good if the TSOs of the buildings could inspect once or twice per year the roofs of the building in the dry season to catch issues in time before too much damage is done.

T. Eriksson reported the status of ELENA. The 8-hour shifts were shared between operation for GBAR and ELENA commissioning and the GBAR experiment managed to decelerate Pbars to very low energy. There were improvements of the bunched beam cooling and transfer tests between AD and ELENA were carried out. The profile monitor in the GBAR transfer line cannot be used – a meeting will take place today between the specialist and BE-BI representatives to follow this up.

AD users

H. Wilkens said that the BASE experiment will dump the Pbars stored since last year and will take the beam over the weekend.

SPS

F. Vellotti reported the status of the SPS ([Annex 7](#)).



The SPS week was dominated by a large water leak in the NA, leading to 81% availability. The leak was caused by a rusty valve that broke and caused 23 hours of downtime for the NA. The ion setting up on Tuesday and Friday was perturbed significantly by very frequent trips of a quadrupole in TT2 (used only for ions). It is being followed up by the PS team and TE-EPC. On Wednesday, the MD was dedicated to the crab cavity. The MD was carried out in COAST, and the studies were regarding the estimation of the emittance growth with crabs on. On Thursday, the HI MD for LIU beams took place. Four batches of 12 bunches at $2e11$ ppb were accelerated at FT. On Friday something peculiar was observed: The MKQH was set to kick on MD2, but, instead, a few times in an hour, it was fired on the SFTPRO beam, luckily during the ramp. The H damper was tripping as consequence of the too large oscillations to correct for. ABT experts have been alerted and they are investigating this issue; in the meantime the kicker has been removed from operation. AWAKE started smoothly during the week-end.

North Area

B. Rae reported that it was a very good week. The DSO tests of the new lines were completed on Tuesday and a first beam went through on Wednesday. First beam was delivered on Thursday and the line setting-up is on-going.

North Area Users

H. Wilkens reported a few issues related to cryogenics affecting the experiments.

AWAKE

E. Gschwendtner said that the physics run started on Sunday. There are now in the middle of the run and things are going pretty well.

CLEAR

A. Curcio reported on the CLEAR status ([Annex 8](#)).

After the successful DSO test last week, they are just waiting for the photocathode alignment to be completed before restarting with beam.

LHC

M. Zerlauth said that the LHC production was pretty good over the last week. They will continue with standard physics until the MD block next week. Operation was perturbed by a few accesses during the week-end and by an EN-EL intervention that affected the 18 kV distribution yesterday. A low energy run test could be scheduled on next Monday.

TI

J. Nielsen reported on the main events of last week ([Annex 9](#)).



The AD roof water look was already mentioned in the AD report. On Wednesday afternoon, there was an electrical perturbation confirmed by EDF on the 400 kV network. On Thursday afternoon, the BA81 cooling station tripped, due to a leak interlock, after a magnet circuit had been refilled without any notification to TI.

3. ITS2 activities

The Linac2 and Linac3 activities will be presented by **C. Mastrostefano** at the next FOM.

LEIR

D. Nicosia presented the activities scheduled in LEIR ([Annex 10](#)).

There are at the moment only inspection activities.

PSB

D. Hay presented the list of activities scheduled in the PSB ([Annex 11](#)).

Apart from usual inspection and visits, the head amplifier of the PSB TFB PU4L5 will be re-cabled. This is a crucial test in view of the LS2. Should this test fail, an extra hour will be required at the restart to come back to the initial configuration. The 2L1 WS will be replaced, entailing a venting of the sector and defining the PSB restart time.

PS

F. Pedrosa presented the list of new activities scheduled in the PS ([Annex 12](#)).

Among usual inspections and visits, tests will be carried out on the PS RF25kV power converter. It will take 10 minutes and the cavity will be equipped with flashing lights. The upgrade of the PR.BG182 readout electronics and the PSC10 maintenance could affect the restart. A FAST tuner solenoid will be installed in the PS ring and work will be carried out on the longitudinal damper cavity. An RF airline will be installed in SS89 (30 hours needed) and the cable area will be fenced out until the end of the run. A wide-band pick-up will be removed from SS90, which will vent the sector and will have an influence on the RF test schedule.

SPS

D. Mcfarlane presented the updated list of activities scheduled in the SPS ([Annex 13](#)).

A preliminary list of 30 IMPACTS was given (much more to come at the next FOM). There will be a vacuum intervention in Arc2+ and work by EN-EL might affect intermittently lights and crane during 30 min. Even if the IMPACT was not submitted yet, **M. Fraser** confirmed the crystal installation in LSS2 and **J. Ferreira** also confirmed a vacuum intervention in UA9. The lift maintenance schedule was given.



D. Mcfarlane reminded everybody to wear their correct personal safety equipment and to take special care that no doors are forced to avoid lengthy patrols.

4. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

The LHC MD block is starting from Wednesday next week. The UA9 run is scheduled on the 17/09 and the COLDEX run will follow the technical stop on the 19-20/09.

H. Bartosik confirmed the dedicated MD in the SPS (Crab cavities). There will be no beam for the East Area from the PS from 3.00 to 6.00 PM.

5. AOB

- The LHC MD beam requests for the injectors were presented by **J. Uythoven** ([Annex 14](#)) with mainly standard beams. **H. Bartosik** representing the injectors and the LHC MD team will review the list together as soon as possible to add missing information.
- **A. Bland** reported on the suspension of the analogue Cable TV service that will take place during the ITS2 ([Annex 15](#)). The idea is to power off all active CATV elements including fibre links and disconnect all connections between the CATV and the digital video produced by the Vistars, beam camera digital video encoders, CCR scopes and UHF antenna on the CCC roof. The objective is to identify during operation any users that are still relying on the CATV.
- **A. Bland** gave information on the IT Department virtual machine reboot campaign to patch L1TF vulnerabilities ([Annex 16](#)). On the 12th, 17th, 18th, and 19th of September the IT Department will reboot a large part of the Cloud infrastructure they manage to mitigate the "L1TF" security vulnerabilities. **B. Mikulec** asked him to investigate if the intervention on Matlab/Mathematica license servers could be carried out during ITS2 and not on the 12th of September.
- **B. Mikulec** informed that most operational passwords will be changed during ITS2.
- The maintenance of the YEA04.PSR=353 door was approved ([Annex 17](#)).
- **X. Genillon** presented the procedure of intervention to check dimensions in false floors that will take place during the technical stop ([Annex 18](#)).

Next Meeting: Tuesday 11th September 2018.

Minutes reported by [JB. Lallement](#) on 4th September.



Summary of the 29th FOM Meeting

Held on Tuesday 11th September 2018

Agenda <https://indico.cern.ch/event/755370/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Final ITS2 list of interventions*
- 4. Beam stop/restart times - UA9/COLDEX runs*
- 5. Schedule update*
- 6. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 28th FOM](#) were approved.

2. Status of the machines

Linac2 & Linac3

R. Scrivens reported the status of the linacs ([Annex 1](#)).

Linac2 had a perfect week with no fault and 100% availability.

Linac3 had a pretty good week with only one RF trip on Thursday and a source microwave trip yesterday. In order to reduce the disturbance on the LEIR operation, the oven refill normally scheduled on Thursday will be postponed to the technical stop next week*.

* Due to an unforeseen issue with the source, the oven refill took place on Wednesday 12th.

Linac4

B. Mikulec reported the status of Linac4.

The RF conditioning was completed on Friday. The beam commissioning is on-going.

LEIR

K. Cornelis presented the status of LEIR ([Annex 2](#)).



There were 2 accesses on Monday and Tuesday to fix an issue with BPMs (first turn measurement) and, due to a bad contact from the emergency stop, the ETL.BHN1020 was difficult to restart once the access finished. The MDRF cycle was used on Friday for 75 ns setup in the SPS. Today, huge oscillations were observed on the EARLY beam trajectory sent to the PS. It might be due to a problem in the YASP database of the LEIR/PS transfer and injection steering. It is being followed up.

PSB

G.P. Di Giovanni reported on the PSB status ([Annex 3](#)).

It was a very good week with 99.9% availability. The timing issue, which was preventing to map any cycle on MD2 timing user, was fixed (although the reason was not found). The cause of the few RF trips of the C16 cavity the weekend before was found and fixed (overload protection broken). The list of cycles is ready in view of the LHC MDs.

ISOLDE

J. Alberto Rodriguez reported the status of ISOLDE ([Annex 4](#)).

It was a difficult week at ISOLDE. Last week's experiments with Be ions on GPS were completed on Thursday morning and Ne ions were sent to the MINIBALL with no issue. The main goal of the week was then to deliver Sn ion from HRS to the MINIBALL. Unfortunately, there were two main issues. First with many SRF09 cavity trips and secondly, the yields for ^{134}Sn were very low from the HRS target. It was decided to switch from ^{134}Sn to ^{132}Sn on Saturday, but the target failed on Sunday morning. As a backup solution, the users finally went for Xe ions.

ISOLDE Users

K. Johnston confirmed it was quite a difficult week for the users at ISOLDE. On GPS the end of the ^{11}Be run for emission channeling experiments went very well, the problems were on HRS. This was a challenging experiment in every aspect: a difficult to produce beam (^{134}Sn as a SnS molecule); HIE-ISOLDE running at maximum capacity and an unexplored spectroscopic area. In the end the physics program could not be fulfilled due to the issues with the cavities and the production of the primary beam. Some initial data were taken on ^{134}Sn and a switch to ^{132}Sn allowed for a night on this isotope before the anode of the ion source failed. The users would however really like to express their appreciation for all the efforts which were made by the ISOLDE technical teams to sustain the run. Although the physics output was in the end quite modest, the whole ISOLDE team did their best to ensure that physics was possible until the target failed.

PS

D. Cotte reported the status of the PS ([Annex 5](#)).

It was a very good week with 99% availability. The main issue of the week was due to a wrong interlock received on the C20-80 cavity. The problem was coming from a cable connector in bdg. 368. In order to allow for an LHC fill, the C20-92 was used as a spare during the investigations of the vacuum specialist. The F16.QDE217 mis-behaving is under investigation by BE-CO experts. The



integrated intensity delivered to nToF is still well ahead of schedule (5% above schedule, 77% of 2018 run goal).

East Area

B. Rae said it was a pretty good week. There was just a small issue on Wednesday with an update of CESAR.

East Area Users

H. Wilkens said that the users were very happy.

nToF

E. Chiaveri said it was a good week for nToF as well.

AD - ELENA

P. Freyermuth reported the status of AD ([Annex6](#)).

The week started pretty well with beam sent to ELENA and Gbar and a first profile measurement in the ELENA extraction line. Unfortunately, a vacuum leak developed in the electron cooler collector on Thursday (similar to July's issue). The in-situ repair was on-going.

T. Eriksson said they had two days with pbars in ELENA, equally shared between commissioning and Gbar. Given the present status of the AD, they resumed the ELENA commissioning with the H⁻ source.

AD users

H. Wilkens said the users were hoping for a quick fix of the E-cooler.

SPS

V. Kain reported the status of the SPS ([Annex 7](#)).

It was a pretty difficult week with main downtime (21 hours) coming from an HV cable breakdown at ZS and NA beam performances affected by 50 Hz bursts (solved now) and H6 radiation monitor interlocking frequently with current wobbling setting on T4. There was also a BEQ3 compensator trip whose reason is not understood yet. Concerning the ZS HV cable breakdown, the issue started on Friday when ZS could not reach the 230 kV voltage anymore. After expert's investigation, the HV cable was found damaged (due to radiation) in the tunnel. After some cool-down time, an access was granted on Saturday morning and the cable was replaced by a spare fortunately available. The lifetime of the cable (changed in 2009) was estimated to 10 years and their exchange planned during the LS2 was recently canceled. Given the present situation, it will be re-discussed. The emittance blow-up measurements with Crab cavity MD in COAST were carried out and results confirmed expectations.



North Area

B. Rae said that he had nothing special to report besides issues already mentioned. The H6 radiation monitor issue is known for years.

North Area Users

H. Wilkens added that given the very low e^- yields, the wobbling settings on T4 had to be changed and the intensity consequently increased, what triggers the alarm on the H6 radiation monitor. The beam line physicist should work on this issue.

AWAKE

E. Gschwendtner could not attend the meeting and sent the following report:

"Data taking continues until Monday 17.9 morning, 8:00. Seeded self-modulation studies of the proton beam during the weekend. The electron klystron failed on Friday evening, fixed yesterday Monday, now back to electron acceleration program."

CLEAR

A. Curcio reported on the CLEAR status ([Annex 8](#)).

The new setup for THz production from metamaterials was installed and the photocathode laser was aligned. First experiments will focus on the test of the CLIC BPMs and the THz production from metamaterials.

LHC

S. Redaelli said it was a pretty good week with few beam dumps. The LHC will stop the production for physics tomorrow for the MD. Before making an official request, they are discussing with the injectors the feasibility of a BCMS with large emittance. The machine is down since yesterday due to an issue with cryogenics in P6.

TI

J. Nielsen said it was an eventful week for the LHC, but very quiet for the injectors.

3. Final list of ITS2 activities

Linac2-3

C. Mastrostefano presented the activities scheduled in the linacs ([Annex 9](#), [Annex 10](#)).



In Linac2, beside usual inspection and maintenance, two RF tubes will be replaced on buncher2 and DTL tank2. The tunnel will be closed on Tuesday evening and the machine restarted on Wednesday morning.

Linac4

B. Mikulec is collecting the list of activities. The plan is to restart the machine on Tuesday evening.

LEIR

D. Nicosia presented the activities scheduled in LEIR ([Annex 11](#)).

There is no planned critical intervention.

PSB

D. Hay could not attend the meeting. The intervention list, that does not greatly differ from the one presented at the previous FOM, was uploaded on the Indico page after the meeting ([Annex 12](#)).

PS

F. Pedrosa presented an updated list of activities scheduled in the PS ([Annex 13](#)).

The camera on FT16.BTV218 will be replaced, the PS LIU wire scanner will be inspected, tested and a PMT will be installed in S54. There will be tests on the LT.BHZ30 magnet and fencing will be installed around. This intervention could impact on the closure of the Switchyard. The intervention on the wide band pickup in SS90 and the installation of the RF airline in SS89 will require the 30 hours.

SPS

D. Mcfarlane presented the updated list of activities scheduled in the SPS ([Annex 14](#)).

The installation of the goniometer in LSS2, the QD drift aperture restriction investigation in Arc5+ and the LSS5 W-target installation and Roman-Pot maintenance will require venting the concerned sectors. The monte-charge in BA6 will be out of use all Tuesday. **D. Mcfarlane** reminded everybody to wear their correct personal safety equipment and to take special care that no doors are forced to avoid lengthy patrols.

4. Beam stop/restart times and UA9/COLDEX runs

R. Froeschl presented the RP recommendation ([Annex 15](#)).

S. Deleval said that the EN-CV intervention in the vicinity of the PS septum 16 triggering the cool-down time and the beam stop times for AD and nToF might be cancelled.



After the meeting, **S. Deval** confirmed the re-scheduling of the intervention and the RP recommendation was updated and circulated to the FOM mailing list. It is given below.

- 17/09 07:30: Stop SFTPRO; start UA9 run
- 17/09 16:00: Stop ISOLDE, TOF and EAST proton beams – 16h cool-down
- 18/09 05:00: Stop all proton beams (except COAST injection for UA9) – 3h cool-down
 - max. 10 COAST injections/hour later than 05:00 (3h before the RP survey);
 - beam stopper downstream of Linac2 source in safe position when COAST is not requested
- 18/09 07:30: Stop all ion beams and COAST injection for UA9 – 30min to 1h cool-down
- 18/09 08:00: RP survey for PS complex
- **18/09 08:30: Access start for SPS**
- **18/09 09:00: Access start for PS complex**
- 19/09 14:00: COLDEX RUN starting
- 20/09 13:00: Stop COLDEX RUN
- 20/09 13:30: Access for COLDEX
- 20/09 14:00: SPS ready for NA physics

H. Bartosik commented that the COLDEX run preparation could require 2-4 hours once the machine closed.

5. Schedule update

B. Mikulec presented the [injector schedule](#) (version 1.6).

The LHC MD block will start tomorrow and the injector technical stop will start on Tuesday. The run3 of AWAKE will end on Monday.

6. AOB

- **D. Bozzini** presented the proposal to replace the 9 SPS elevator existing switching sources by new automatic and supervised switches by the end of the 2018 run ([Annex 16](#)). They will be replaced one by one (1 day per switch) over a 2-3 weeks period ideally in October-November. During the intervention on a switch, the operation of the elevator could be resumed if needed within 1 hour. The intervention should first be approved by the TIOC. Planning these interventions during the run could considerably decrease the workload of EN-EL during the LS2 period.
- **K. Cornelis** commented that, if approved, these interventions will require a good communication with the SPS operation. **J. Nielsen** mentioned that EN-EL should contact TI before starting the interventions; TI will then inform the SPS operations team.
- The maintenance of the EAST AREA YEA01.EA1=157 access door was approved ([Annex 17](#)).



Next Meeting: Tuesday 18th September 2018.

Minutes reported by [J.B. Lallement](#) on 13th September.



Summary of the 30th FOM Meeting

Held on Tuesday 18th September 2018

Agenda <https://indico.cern.ch/event/752357/>

- 1. Follow up the last FOM*
- 2. Schedule updates*
- 3. AOB*

1. Follow up the last FOM

V. Kain chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 29th FOM](#) were approved.

Linac2 & Linac3

R. Wegner reported on the linacs ([Annex 1](#)).

Linac2

Linac2 was running very well with an availability of 99.9%.

Linac3

Linac3 was running well until Tuesday (11th of September) night when tank1 tripped and a quite sudden source intensity drop happened. After an investigation, it was found out that the oven one was empty. A re-tuning of the source on Wednesday (12th of September) morning was not successful and it was decided to advance the oven refill for one day. The beam was back on Thursday (13th of September), but no stable intensity could be achieved until the weekend. For today (18th of September) a stable beam of 25 uA was reported.

Linac4

G. Di Giovanni reported on Linac4. The phasing of all RF cavities was ongoing according to the schedule.

LEIR

N. Biancacci reported on LEIR ([Annex 2](#)).

LEIR had a good week with an availability of 85%. Only minor issues happened. The orbits of the Nominal and Early cycles were optimized. The BHN10 functions were deployed to minimize the influence of temperature on intensity. There was an access to work on the head amplifiers UEH12



and UEH14 of the BPMs. On Thursday (13th of September) LIU performance was achieved again after the source refill and due to the good intensity delivered from Linac3. Some space charge and instability MDs were carried out. Finally, the LEIR to PS transfer study with the new optics was successful.

V. Kain asked if it was possible to see if the new BHN10 function improves the stability.

N. Biancacci answered affirmatively and referred to the upcoming supervisor meeting for details.

PSB

V. Forte reported on PSB ([Annex 3](#)).

The only main issue was a one-hour downtime due to a fault with one of the extraction kickers in ring 3 and an (almost contemporary) vacuum pressure peak, because three pumps tripped.

Moreover, the BE.SMH15L1 caused a fault. The LHC MD beams were prepared. The COLDEX MD beams (LHC25, LHC50 and 8b4e) were also tested following the SPS request on Thursday (13th of September). MDs were performed studying optics, RF, brightness and emittance. A kick response measurements to verify the response of the wideband pickup BTP.BPM15 was done. A sampling of the extraction kicker flat-top with a short (rotated) bunch took place on the weekend (w37).

ISOLDE

L. Fadakis reported on ISOLDE ([Annex 4](#)).

A great week for ISOLDE was reported. Six experiments, mainly for solid state physics, were running at the same time. All of them managed to finish their proposal. The HRS was prepared for the upcoming run this week (w38). Also, an MD for the new tape station was performed, which looked quite promising. The old tape station had been fixed as well. Only a trip of a power supply, which took two hours to recover, was reported.

ISOLDE Users

K. Johnston reported by email for the ISOLDE Users.

There were six experiments running last week: mostly taking 57Mn for Mossbauer spectroscopy or 56Mn for emission channelling. For Mossbauer spectroscopy the beam was stable and allowed many measurements to be completed on a wide range of materials at various temperatures: the experiments completed their programme. With emission channeling, 56Mn was used to determine sublattice displacements in multi-ferroic Rashba semiconductors. This was quite an extreme and novel application of this technique in an attempt to understand the underlying physics of the lattice distortion when these materials exhibit multiferroic behaviour. Although analysis is not yet finished, the initial feedback from the is very encouraging. The beam was also very stable and the planned programme was completed. A good week.

PS

I. Efthymiopoulos reported on the status of the PS ([Annex 5](#)).

A good week for the PS with a beam availability above 97%. A major fault on Monday (17th of September) caused 40 minutes of downtime. Two issues were reported, one with the pulse repeater



module, which affected only AWAKE beam. It was replaced. The second on controls, where a wrong timing parameter caused operation of nTOF beams with low intensity until discovered and corrected. Few trips of POPS and RF cavities were fast recovered after reset of the equipment. 380000 cycles were played during the week. 25 beams and 18 users were involved. 840×10^{10} ppp for nTOF and 1440×10^{10} ppp for SPS-FT was delivered. The emittance for the LHC beams was at 1.4 and 1.18 μm , horizontally and vertically respectively. A test of the BGI in turn-by-turn mode was done. The BTV was tested with a fiber read out. The extraction kicker pulses were adjusted to remove satellites perturbing the nTOF measurements. nTOF is 6.1% above the expected integrated intensity curve.

V. Kain asked if the turn by turn measurements were already fully operational.

I. Efthymiopoulos replied that they still were in an experimental stage.

East Area

There was nothing special to report (**B. Rae**).

East Area Users

H. Wilkens reported on the status of the East Area Users.

The users were very happy.

nTOF

D. Macina reported on nToF.

The performance was very good and a lots of statistics was taken. During the stop the last experiments will be mounted.

AD-ELENA

L. Ponce reported on AD and ELENA ([Annex 6](#)).

AD

Bad news concerning the leak in the e-cooler were reported. The tests to switch the cooler on on Friday (14th of September) evening were not successful. More investigations were needed with experts. No beam was available over the week-end and probably till TS2. In parallel the spare collector for the electron cooler is being repaired. Also, an intervention of the tube amplifier of a cavity was carried out and was not completely finished.

ELENA

T. Errikson said that the H- source was running. The studies on lifetimes and the working point were continued. The injection line optics were also improved, using the limited available instrumentation. The good news was that the GBar experiment got beam and managed to decelerate the beam from 100 KeV to a few KeV. Additionally, first profiles with the SEM in the beam line were obtained. The next step was to study the effect of the e-cooler on the H- beam. If the epoxy fix



in the AD e-cooler does not work, the collector would have to be replaced, which would cause a down time of about two weeks (there is also the bake out). If this would be the case ELENA would switch to proton mode to be able to continue.

AD/ELENA Users

H. Wilkens reported on the users.

There was no beam.

SPS

K. Li reported on the status of the SPS ([Annex 7](#)).

This was an eventful week for the SPS with an availability beyond 90%. The week was dominated by the LHC MDs starting from Wednesday (12th of September) morning at 7 and lasting until Monday (17th of September) morning at 6. Fixed target beams as well as AWAKE were taken at maximum duty cycle whenever it was possible to efficiently fit them around the LHC MDs. Page 1 was regularly updated with messages and plans for longer stable supercycle compositions to help the planning for the NA and AWAKE physics. Sometime also had to be spent to prepare some of the special beams needed for the MDs such as the low intensity BCMS variant, for example. The overall LHC MD3 run was successfully completed with little downtime from the injectors and thus with a minimum loss of valuable LHC MD time. The largest fault in the SPS lasted a bit more than two hours and was due the MKE4 needing a reconditioning after a vacuum spike after the low intensity BCMS fill for LHC. In addition, the several weeks long lasting problem with the 50 Hz bursts on the fixed target beams were finally identified on Monday (17th of September). The problem came from the chromatic sextupoles where a faulty impulse transformer gave strong 50 Hz signals onto the LSFCs at random times. The element was exchanged and the problem finally fixed. On Tuesday (11th of September) the preparation of the LHCION3 Q26 ion cycle had to be interrupted. It was found that the QD did not follow the programmed function. The problem was identified to be a voltage limitation setting on the transformers of the main quads. On Friday (13th of September) these voltage limits could be raised and this problem was also fixed. The Q26 ion cycle preparations continued. The problem with the MKQs pulsing in the wrong cycle was also followed up. After some investigation, a faulty timing card was finally found to be the source for the erroneous pulsing. The card was exchanged and also this problem was thus finally fixed. Moreover, a hardware interlock was put in place to prevent this type of mis-pulsing of the MKQ in the future. The radiation alarms in H6 continued to pose problems. The intensity on T4 was lowered slightly after the change of wobbling.

HiRadMat had accesses planned over 3 days. These could not all be carried out as planned for various reasons but the main difficulty was to schedule the different accesses around the LHC MDs - a virtually impossible task as it turned out. The only days of access were finally two days. The high intensity MD at flat bottom was significantly penalized due to the investigation on Tuesday (11th of September) on the ions cycle. Only a few scans were made to study the longitudinal stability.



The UA9 special run had finished. The COLDEX special run was planned for Wednesday (19th of September) afternoon. Beam for AWAKE was planned for Friday and Saturday (20th-21st of September), which had to be confirmed.

North Area

B. Rae said that there is still the H6 radiation issue.

North Area Users

H. Wilkens reported on the North Area Users.

Despite the excellent performance of the SPS, the amount of fixed target physics cycles was relatively low (3000/day) this week (w37). This was a consequence of the large amount of LHC MDs at injection this week (w37).

AWAKE

E. Gschwendtner reported on AWAKE.

After a bad start of the week (w37) the performance was rather good on the weekend. The measurements, which were taken over the weekend, showed interesting physics.

V. Kain asked when it was known if the beam will be taken by AWAKE during the upcoming weekend.

E. Gschwendtner said that it would be decided on Thursday (19th of September) the latest.

CLEAR

A. Curcio reported on CLEAR ([Annex 8](#)).

A vacuum problem in the middle of the Linac was solved. The first beam after the restart was seen and it was possible to measure the quantum efficiency of the “new cathode” for the first time. The pulse picker of the photocathode-laser had to be replaced. The plans for the future were further measurements of the quantum efficiencies, the optimization of the beam and tests on the CLIC BPMs.

LHC

J. Wenninger reported on the LHC.

The LHC MD was one of the most efficient MDs ever. The technical stop will be finished on Friday (21st of September) and the accumulated issues over the TS might be fixed afterwards (Friday evening). On the weekend (w38) there will be no long but frequent filling. At the beginning the cycle will be a two-hour duration and slowly increased to six-hour duration. On Monday (24th of September) normal production will resume.

V. Kain asked about the special physics test.

J. Wenninger replied that it would take place on Thursday (27th of September) for high beta at injection. Based on the outcome of this test, another one week run later in October (2018) could take place.



TI

J. Nielsen reported on TI.
Nothing special to report.

2. Schedule updates

V. Kain presented the injector schedule ([version 1.6](#)).

There were changes for the COLDEX run times on Wednesday (20th of September) announced. The runs stop earlier at 12:30 to have a longer access. Another reminder concerned the North Area. There will be a switch to constant optics slow extraction. The intensity will be lowered at the beginning and then the new octupole configuration will be checked for fixed target beam with hopefully little impact on the North Area operation.

3. AOB

A. Bland mentioned the password change. To obtain the new passwords, either the operators or **A. Bland** should be asked.

Minutes reported by [S. Hirlander](#) on 18th September.



Summary of the 31st FOM Meeting

Held on Tuesday 25th September 2018

Agenda <https://indico.cern.ch/event/759482/>

- 1. Follow up the last FOM*
- 2. Schedule updates*
- 3. Debriefing of TS2*
- 4. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 30th FOM](#) were approved.

[Linac2 & Linac3&Linac4](#)

G. Bellodi reported on the linacs ([Annex 1](#)).

[Linac2](#)

Linac2 showed a smooth operation until the TS. Afterwards a broken RF gravity switch had to be replaced. Tank2 went to fault on Friday (21st of September) night and needed to be repaired. A replacement of the whole resonator was necessary. Regular operation was recovered by Saturday (22nd of September) midday.

[Linac3](#)

Linac3 was running well. Only two issues were reported. One was a microwave trip and the other a RFQ trip over the weekend. A new 100 ug/cm² thick GSI-type stripping foil was put in operation on Friday the 21st of September and good performance was confirmed by LEIR. A problem with the amplitude3 amplifier occurred Monday (24th of September), and was still ongoing.

[Linac4](#)

The previous week started with routine measurements on Monday (17th of September). Tuesday (18th of September) there was the technical stop with tests on the RF amplifier of the source, and upgrades from EPC. Following the technical stop an accident on the CCDTL3-4 modulator and some problems with the FGC63 in the LEBT and MEBT occurred. The linac was available for measurements and tests only on Friday (21st of September) morning. Now retuning is ongoing. The source was cesiated with good results. The Autopilot was resumed with the minimal functionalities.



LEIR

M.E. Angoletta reported on LEIR ([Annex 2](#)).

The source of a fast vertical instability was identified and suppressed and guard voltage was added to some more BPMs. From Wednesday to Thursday (19th – 20th of September) LEIR recovered from the TS. On Friday (21st of September) a new GSI stripper foil was successfully installed in Linac3 and did not change the LEIR performance significantly. On Monday night (24th of September) the Tank3 amplifier tripped. The amplifier had to remain in fault/standby to allow a proper diagnosis by the EPC expert on Tuesday (25th of September) morning. No beam to LEIR was sent until then. There were several MDs in the machine carried out including a faster acceleration ramp allowing now 8 injections per cycle, first turn measurements with the BPMs and acceleration attempts with the e-cooler.

PSB

A. Albright reported on PSB ([Annex 3](#)).

The first half of the week (w38) up to the end of the ITS went well, and the recovery was very smooth with only a few minor hiccups before beam was back. Afterwards beam was provided to the SPS for the COLDEX run on time and within specifications. One important outcome was the discovery that a couple of ring vacuum valves have developed a leak, which prevented the planned replacement of a wire scanner in ring 2. Towards the end of the ITS the problems with BTY.BHZ301 started, as it was necessary to switch to a spare power converter. The spare converter started to trip with too many cycles destined for ISOHRS in the super cycle on Friday (21st of September). On Saturday (22nd of September), with the help of the piquet and equipment specialists, it was possible to enter a steady state by limiting the number of ISOHRS cycles and grouping them in the supercycle to avoid changing the current in the magnet. A further problem appeared on Saturday (22nd of September), when BTM.BTV10 was found to be stuck half into the transfer line. To repair BTM.BTV10 an access was required to manually move the screen out of the line, as the crate was not responding.

B. Mikulec asked if it was known when the repair of BTY.BHZ301 would be finished.

The answer was that all parts have arrived and preparations should be finished soon.

B. Mikulec asked **J. Ferreira** about the vacuum valve situation in the case of an intervention in that area.

J. Ferreira answered that the situation would be very complicated and it would be good if it could be avoided, as the septa might require bake-out after the intervention.

ISOLDE

E. Siesling reported on ISOLDE ([Annex 4](#)) and sent an email:

It has been a busy week at ISOLDE with a number of issues.

Overall the machine itself has been performing very well but there were issues with cryo and with the protons from PSB that made setting-up the machine difficult and in case of the protons, reduced the physics time significantly.



At GPS we have had many collections (228/223Ra, 148Gd, 133Ba) for different experiments taking beam whenever possible in parallel to the HRS physics. Things there worked very well (whenever protons were available).

At HRS we set up with stable $^{22}\text{Ne}^{7+}$ and are sending $^{28}\text{Mg}^{9+}$ radioactive beam at the highest energy we can deliver, 9.4MeV/u to the Miniball experiment in the first HIE beamline. For the ionisation of the Mg we have the RILIS lasers running. We also set-up and send this beam to the ISOLDE Solenoidal Spectrometer in the second HIE beamline in preparation of the first ISS physics run later this week.

We suffered from a few major issues:

- On Wednesday-morning around 10h15 the cryo plant compressor stopped due to an over-current. This took down the whole plant and we lost all SRF. Thanks to the fast reaction of the SM18 cryo operators and Daniel Valuch from RF to get back up the SRF as soon as the plant came back up we had the HIE beam back at 16h30 and managed to keep the schedule for setting up to Miniball.*
- On Wednesday-afternoon at ~14h a resistor inside BTY.BHZ301 burned. This is the bender that sends the beam to HRS instead of GPS. EPC moved to the spare but the spare has an issue going to 0A when pulsing. This problem lasted throughout the weekend and caused together with extraction problems at PSB (due to a half inserted screen in their beamline on Saturday) about 30hrs of downtime for HRS physics.*

Jose Sanchez managed to find good settings for the super cycle with many consecutive cycles HRS so that there were little 0A switches and the power supply held. The users received 1.5uA out of max 2uA proton current throughout the weekend and are very grateful for the effort that PSB and EPC put in to keep going!

- Wednesday-evening a vacuum leak occurred at Miniball bringing down the XT01 line. Luckily the fast valve was fast enough to protect the SRF Linac.*

On the positive side:

The SRF as well as the REX RF systems have been very stable during the whole run, even at this highest energy (9.4MeV/u). Very few trips even after the cryo plant went down which normally would cause some instabilities over quite some time (we experienced that during the power cut some time ago).

During this week we also had some MEDICIS target irradiations in parallel to the HRS physics. We also continued tests on the new Fast Tapestation in the LA2 line in parallel to the OLD Tapestation.

ISOLDE Users

K. Johnston reported for the ISOLDE Users and sent an email:

Last week the main experiment was at XT01 of HIE-ISOLDE: T-REX taking ^{28}Mg at 9.4MeV/u for DP reactions exploring the island of stability. The main interruptions have been the protons both at LINAC2 and the kicker at ISOLDE. When the beam has been available the run has been quite smooth and steady data are being taken. If the experiment can run for about one more day they should be able to complete their programme.

Many thanks to all for their help with allowing ISOLDE to maintain the run - in spite of the issues with the bending for HRS. Debugging the inserted screen and devising the supercycle recipe were not obvious and these efforts are greatly appreciated by the users.



PS

A. Guerrero reported on the status of the PS ([Annex 5](#)).

All beams except those for UA9 were switched off at 16h00 on Monday (17th of September) and all beams were off by 07h30 on Tuesday (18th of September) for the TS2 access. The PU90 was replaced by a vacuum pipe and the vacuum was well recuperated by the restart on Wednesday (19th of September). The switchyard was in beam mode at 12h30 and the PS at 13h00. The First Line had to intervene to lock in some equipment in the EAST line and after F61N.QFO02. After the FL intervention, the PIPO came for the septa SHM57-61. The issue was caused by the water circuit. Since no users could take beam, turn by turn injection profile measurements were envisaged. However, they had to be stopped because BSF54 got stuck in the beam pipe and an access was needed to bring the device out. The problem came from a PLC blocking and there are no spares left. This device will be completely replaced during LS2 thus would remain unavailable until the next run. The BSF48 was still available for the 2 turn tests. The beam was back at 18h00, but not without issues. The EAST beam suffered from spill and extraction line trajectory instabilities until Thursday (20th of September) morning when an OFF/ON action on F61.QFO03 solved a regulation issue in the quad. Also, the PR.WFNP tripped frequently. The PIPO and the specialist worked on the device on several occasions, but found no particular reason for the problem. The beam was down in total for around four hours and no LHC type beams could be played until the descending slopes of the cycle functions were reduced on Friday afternoon (21st of September), on time for the LHC restart. Also on Friday (21st of September) the EAST beams were stopped for 1h20min to remove an interlock in ZT11.BHZ01. The week-end was difficult too due to amplifier problems in C81 and C11. The PIHLRF was called on Friday night (21st of September) and finally an access had to be organized on Saturday (22nd of September). The amplifier could be exchanged for C11 and the other one was pending. The most affected beam has been TOF, which was played with reduced intensity until the access on Saturday (22nd of September). The PIPO was called twice, Friday night and Saturday (21st and 22nd of September) afternoon to restart POPS which slightly delayed the LHC restart on Friday. In both cases the issue was coming from the cooling pressure in DC4 that had to be increased in both occasions. The total beam downtime was almost 3 hours. Finally, there was also a PLC issue affecting the transverse feedback (beam down during 1h). Beams for COLDEX were delivered as requested and the same for SFTPRO that started with low intensity (~500e10). AD requested beam again (I=1350e10p).

B. Mikulec asked **B. Rae** if there could be something improved concerning the lock in of the EAST area equipment, since some time was lost because some devices were not locked in again.

B. Rae said this will be followed up.

East Area

There was nothing special to report except a stop on Wednesday (27th of September) from 17h00 to 18h00 due to visits (**B. Rae**).

East Area Users

H. Wilkens reported on the status of the East Area Users.



The Cloud experiment has started on Monday (24th of September) and high-school student groups are preparing for their beam measurements.

nTOF

D. Macina reported on nToF.

An installation problem in area 2 was mentioned. Normal operation should be regained in the afternoon (25th of September).

AD-ELENA

B. Dupuy reported on AD and ELENA ([Annex 6](#)).

AD

Monday and Tuesday (17th and 18th of September) the plan (1) on the e-cooler was continued (see below), and the replacement of the repeller power supply and the setting up of a shunt on the cathode HT switch were carried out. Sparks were observed on Friday (14th of September). Despite all these repairs, it was impossible to raise the voltage on the cathode and to produce electrons, since there was too much sparking. On Tuesday (17th of September), at the end of the afternoon, the decision was made to follow the plan (2). During ITS (Injector Technical Stop), clogging resin was poured. On the following Thursday (20th of September) and Friday (21st of September), after verifying the clogging of the leak, the water circulation was restored. It was necessary to change several times the filter and rinse the circuit many times in order to obtain a conductivity lower than 0.1 uS.

Other interventions were performed and disrupted or were disrupted by the re-occurrence of the failure of the e-cooler over the weekend.

The power tube of the cavity "C10-26" had breakdowns. The specialists can't work during ADE ring access. The tube was cleaned and reinstalled, which has to be continued.

The cooling of the target was converted from a water circuit to an air circuit during ITS. The first beam pulses were only possible under the control of specialists. It took place on Friday (21st of September). At 15:30 (21st of September), the antiproton beam was correctly injected into the AD ring and cooled slightly to 300 MeV/c. It was then lost in the ramp (300-100) at 2.4 s of the 100 MeV/c plateau. On Saturday (22nd of September), **L. Soby** and **D. Dupuy** worked on all the processes to try to capture the beam at 100 MeV/c without success. It has to be noted that the cavity "C02" tripped several times due to an electrical problem in the 193-RA-J008 (low level electronics) racks. On Monday (24th of September) they will continue investigations with the help of the specialists.

The plan:

1. Differential pumping on the cooling circuit of the e-cooler, with the pump at 27 kV potential. This pumping replaces the circulation of water at the level of the cylinder head.
2. The resin will be passed into the cooling circuit of the cylinder head. An air circuit will be established, to avoid obstruction. Those conditions must be maintained for 24 hours.



3. Change of the breech (top part of the collector) by the previous-breech. Unfortunately, this is a version already changed in July. The leak is not ironed yet. The welds are made in parallel with the action (1) and (2).

ELENA

Due to the vacuum leak on the AD no Pbar was send to ELENA during this week. H- beam was used by the commissioning team and by Gbar. On Friday (21st of September) the ELENA insulation transformer died and no more H- from the source were available.

The AD e-cooler was back, but the beam was lost during the ramp from 300 MeV/c to 100 MeV/c.

B. Mikulec asked if the e-cooler problem was at the same location as the previous one.

B Dupuy answered affirmatively and explained that this was a weak point of the design of the cooling circuit.

B. Mikulec replied that this should be considered for a potential design change.

Following discussions on the future actions to solve the situation, it was decided to follow up after the FOM. More input was needed from the e-cooler specialist who would soon return to CERN; only then an estimate on the beam stop for AD can be given.

AD/ELENA Users

H. Wilkens reported on the users.

There was no beam.

SPS

H. Bartosik reported on the status of the SPS ([Annex 7](#)).

The first part of the week (w38) was devoted to a 24 hours UA9 run, the 36 hours' technical stop and a 24 hours' slot for the COLDEX experiment. The main highlights from the technical stop were the installation of a crystal in LSS2 for testing loss reduction during slow extraction, the installation of a prototype vacuum chamber for eliminating the momentum aperture bottleneck, and the reconfiguration of the Landau octupole circuits for minimising the induced second order chromaticity in the Q20 optics. The start of the COLDEX run after the technical stop was slightly delayed because of the retuning of the power converters for the octupoles after the modification of the circuits and because of an issue with the QF function generator following a firmware update. The restart for North Area physics was scheduled for Thursday (20th of September) 14h00. At this point, the Constant Optics Slow Extraction ("COSE") was put in operation, which allowed constant extraction conditions from the SPS. The beam could be sent to the North Area at around 17h00 once the Firstline piquet solved an issue with the MBB2404M power converter for T4. The beam intensity was increased to around 3.5×10^{13} ppp to satisfy the higher intensity on the targets requested by the experiments. After a few iterations on optimising the spill structure (in particular to avoid intensity spikes at the beginning) a very good spill quality had been achieved. A ZS girder scan was performed on Saturday (22nd of September), but the original position was already giving minimum losses. So far the experience with COSE in operation was very good. The potential loss reduction



during slow extraction needs to be studied on the long term. The beam availability for the North Area was unfortunately relatively low these days (around 80%). Several issues in the injectors led to long downtimes. In addition, Friday night (21st of September) the power converter for the MBE2103 could not be restarted after a trip of Chains 13 and 15 (4.5 hours no beam) and Sunday night (23rd of September) Chain 1 was lost because of a bad contact on a shielding door in BA2, which required a patrol plus the RP piquet intervention to reset the RP veto (2 hours no beam). The LHC started to take the pilot beam on Friday (21st of September) evening after their technical stop activities were finished. The BCMS beam was injected into the LHC on Sunday (23rd of September) for the intensity ramp-up with no particular issues. Finally, it should be mentioned that measurements of the nonlinear chromaticity performed on Friday (23rd of September) confirmed that the new octupole powering scheme deployed during the technical stop reduces the second order chromaticity induced by the octupoles in the Q20 optics as expected.

B. Mikulec asked **V. Badin** for a brief report on the COLDEX measurements.

V. Badin said that good data was collected and almost everything, which was planned, was measured. The analysis is now ongoing. A remark was that after a TS a two hours' recovery is usually planned, which often takes eight hours instead, which might be good to consider in the schedule for the future.

North Area

B. Rae said that there was nothing special for the NA. Beam back at 18h00 on Thursday (20th of September) after the TS and COLDEX run. And the slow extraction cycle change made by SPS did not affect the beam lines too much.

North Area Users

H. Wilkens reported on the North Area Users.

The beam availability was very bad until Saturday (22nd of September).

AWAKE

E. Gschwendtner reported on AWAKE.

There were now two days of proton beam. Everything was going according to the plan.

CLEAR

There was no report on CLEAR.

LHC

E. Metral reported on the LHC.

The LHC is back to production since Monday (24th of September). At 16h00 the beam was going to be dumped for a BSRT calibration test, taking a few hours. Thursday (27th of September) there is a test planned for the low energy high beta cycle. The test takes 12 hours and all supercycles should be modified that it can be done as much as possible in parallel. A few INDIV bunches would be needed (frequent injections).



TI

Nothing special to report (**R. Ledru**).

2. Schedule updates

B. Mikulec asked **E. Metral** if after the dump of the beam in LHC there will be some time for preparation needed.

E. Metral replied that the PS and SPS already prepared in advance.

H. Bartosik said that there will be dedicated MDs on Wednesday (26th of September) on the slow extraction. The other user in the PS will be not affected. In the first part until 13h00 there will be only extraction onto the TEDs, since there were already requests for interventions in the North Area. Afterwards the beam will be extracted until T6. On Thursday (27th of September) there will be high intensity beam in SPS and it was arranged that the North Area cycle, the MD cycle for the LHC MD and the pilot cycle will be played in parallel.

The possible affection of the North Area was going to be discussed after the meeting to optimize the situation.

Concerning the requested intervention in the PS, after some discussion it was tentatively agreed to shift it to Friday morning 09h00 (28th of September), to combine it with an intervention of the water leak in the PSB.

3. Debriefing of ITS2

C. Mastrostefano reported on the achievements during the TS of Linac2 ([Annex 8](#)).

All activities were completed. The beam back was to the LINAC dump at 10h30 Wednesday (19th of September). One remark was made about the LT.BHZ20 knob status: The console showed a magnet fault instead of an access veto from the switchyard.

C. Mastrostefano reported on the achievements during the TS of Linac3 ([Annex 9](#)).

All interventions were carried out smoothly.

D. Hay reported on the achievements during the TS of PSB ([Annex 10](#)).

The PSB QSTRIP BR1.RQCF power converter commissioning tests went well with good results.

The PSB TFB PU4L5 head amplifier recabling went well with stable beam operation.

The PSB 2L1 WS replacement was stopped to avoid venting the BR10 vacuum sector; the replacement of the leaking valves will take place during LS2.

F. Pedrosa reported on the achievements during the TS of PS ([Annex 11](#)).

The tests were properly declared and risk assessment was performed. Problems with the access system were observed (different from the ones observed during ITS1).



It was not possible to fit the patrol in the 30 hours because the full 30 hours were needed as announced, hence the patrol should be considered as unforeseen problems and not included in the 30 hours. Some activities could not be completed on Tuesday (20th of September), but some people only announced that they needed more time too late. There were only minor last minute requests and a good increase on the feedback received for the activities was observed, although the reporting back still needs to be improved.

D. Mcfarlane reported on the achievements during the TS of SPS ([Annex 12](#)).

The feedback of the different groups is listed in ([Annex 12](#)). The diffuser was successfully removed and the crystal was installed in LSS2. An additional slide was added after the meeting containing the maximal individual doses with a collective dose for TS2-SPS of 1 952 man.μSv.

4. AOB

The access maintenance request at the nTOF Target on Wednesday, 26th of September from 08h30 to 17h00 ([Annex 13](#)) was approved.

Minutes reported by [S. Hirlaender](#) on 26th September.



Summary of the 32nd FOM Meeting

Held on Tuesday 2nd October 2018

Agenda <https://indico.cern.ch/event/761826/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Schedule update*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 31st FOM](#) were approved.

2. Status of the machines.

[Linac2, Linac3 & Linac4](#)

JB. Lallement reported the status of the linacs ([Annex 1](#)).

Linac2 had a perfect week with 100% availability.

During the Linac3 oven refill, a water leak was found on the cooling circuit of the source wave guide. The polymer team had an attempt to fix the leak and the repair delayed the linac restart by 24 hours. The beam was available to LEIR on Friday early afternoon. Unfortunately, the wave guide still shows a small leak. It is being followed up.

The Linac4 160 MeV operation resumed on Monday and the beam was made available for various tests and measurements. Up to now, all is OK to start the reliability run on this coming Thursday.

[LEIR](#)

S. Hirländer presented the status of LEIR ([Annex 2](#)).

It was a short week for LEIR because of the planned oven refill in Linac3 followed by a 24 hour waiting time, due to a water leak fix. Switching back to operation on Friday went smoothly. The only major issue was a recurrent trip of the EE.BHN1020, which required an access by the magnet Piquet (a pressure signal was wrongly showing an open circuit). An access during the oven refill on Thursday allowed response measurements on unterminated cables, causing low-frequency perturbations on the beam. The wire connected to the ER.KQFHV31 showed the expected 1.9 MHz reflection pattern. It was



left disconnected, and 50 Ohm terminated. Other elements (ER.UQFHV41, ER.KQF12 and vertical Schottky) were also measured without evidence of any impact. The only mismatch was given by the low beta Schottky, where a test with beam is foreseen. Several MDs were carried out as: improving the new fast ramp cycle, tests of the first turn measurements, a fruitful MD on bunched beam cooling and first successful test runs on reinforcement machine learning studies.

PSB

J-F. Comblin reported on the PSB status ([Annex 3](#)).

It was a good week for the Booster with an availability of 95.2%. During an access in the Booster, a water leak was found on the bending magnet BR.BHZ16. It was agreed with the specialist that an access was needed to fix it in order to avoid any further problems. It was planned on Friday morning in parallel with an access in the PS. On Monday started an intermittent problem with the 4 MHz cavity of the ring 3. From time to time, the voltage on the cavity stayed at its maximum value during a few minutes, and then returned to normal. The RF specialists found that the pre-driver was faulty and took advantage of the access on Friday to replace it. On Wednesday some problems with the ejection caused large beam losses and radiation alarms. The beams to the PS were stopped during 2h30. The root cause was a broken multiplexer in the PS central building, that disturbed the synchronization between the PSB and PS.

Concerning the water leak on the BR.BHZ16 magnet, **M. Amarilla** said that it was still leaking. Investigations are on-going and an access will be probably needed for 0.5 to 1 hour. She asked to be warned if any access would happen during the week.

ISOLDE

J. A. Rodriguez reported the status of ISOLDE ([Annex 4](#)).

It has been a very good week at ISOLDE. The first experiment at the ISOLDE Solenoid Spectrometer (ISS) was completed. 28Mg⁹⁺ were delivered with an energy of 9.47 MeV/u from last Wednesday. The linac has been remarkably stable and there were no significant sources of downtime even though 19 SRF cavities were used at fairly high gradients. In parallel, 199Hg⁺ ions were delivered to the Solid State Physics station at the end of the GLM line for most of the week.

ISOLDE Users

K. Johnston confirmed it was a very good week for the users at ISOLDE. The first experiment at the second HIE-ISOLDE beamline (ISS) took 28Mg at 9.4MeV/u exploring 29Mg via transfer reactions. This was the first experiment at the ISS station and went very smoothly. The beam was stronger than expected and the users were able to collect sufficient statistics relatively early in the run. Once this first part had been achieved they decided to cool their detector array to probe lower energy states and eventually this gave rise to a small vacuum leak, which ended the run on Sunday night, but the experimental program had already been completed. On GPS, 199Hg was collected for biophysics using 2-4 STAGISO pulses in parallel to HRS. This also went very smoothly once some initial problems with the sample holders during the first night were understood. This run also introduced a new biophysics



chamber, which greatly improved the ergonomics of extracting samples for biophysics. The 4 experiments completed their program.

PS

M. Fraser reported the status of the PS ([Annex 5](#)).

It was a good week for the PS with 94.5% availability. Since the weekend and for most of the week the PS was run with POPS in degraded mode and without the C81 cavity until its amplifier could be fixed in an intervention planned on Friday morning. In parallel, the RF team could work on a fast tuner on SS08 and EN-CV could inspect a sump under one of the lifts. The access took longer than expected at 2h 50 minutes due to an issue with the C11 that needed another short access to fix, but the machine could be restarted with POPS back in operational mode. Some issues with SMH57 and KFA21 delayed the FT programmes on restart for 30 and 50 minutes, respectively. The reason for the trips of the PFW circuit PR.WFNP, since start-up after ITS2, were investigated by TE-EPC throughout the week without success. The problem is presently solved by reducing the ramp rate at the end of LHC cycles. During the week nToF reported satellite particles in front of the main bunch with an experiment particularly sensitive to pre-triggers being set up. Work in on-going in close contact with the nToF team. The PS went down on Wednesday morning when a power supply on a LLRF multiplexer stopped the PS being able to synchronise with the PSB. The issue caused almost 3 hours of downtime, but was fixed by the LLRF piquet. On Friday, the PS provided a 16b LHC25 beam for HiRadMat physics.

East Area

B. Rae said it was a pretty good week.

East Area Users

B. Rae said that the users were very happy. The beam line for school finished on Sunday.

nToF

D. Macina said that, beside the issue related to satellite particles already mentioned, there was nothing to report.

AD - ELENA

L. Bojtar reported the status of AD ([Annex 6](#)).

The repair attempt of the electron cooler collector circuit with epoxy was unsuccessful, as a vacuum degradation was observed during the weekend after the e- beam was restarted. They tried to operate with the degraded vacuum (10 times higher pressure than nominal) but they did not succeed. On Thursday it was finally decided to install the spare collector. Its bake-out is on-going. If everything goes well, the beam could be restarted sometime next week.

Answering a question from **B. Mikulec** on possible weakness of the design, **T. Eriksson** said that a new collector is being designed as part of the consolidation program. He added that the present e-cooler ran without major problems during the last 30 years.



J. Ferreira added that the spare being baked out was already repaired in the past and could therefore more easily develop once more a vacuum leak.

Concerning ELENA, **T. Eriksson** said that they were still waiting for a beam. The H- source insulation transformer might be available by the end of the week. They could then be able to restart with H-.

AD users

There was no report.

SPS

F. Velotti reported the status of the SPS ([Annex 7](#)).

It was a rather productive week for the SPS with an availability of 92%. AWAKE took protons from Monday to Wednesday evening. Two experiments were completed this week in HiRadMat (PROTRAD and TIDVG-SiBlock). They took a maximum of 72 bunches and this was handled only with the short HiRadMat cycle to increase the NA duty cycle. Until Friday morning, the SFTPRO cycle was kept with the highest intensity seen this year (i.e. $3.3e13$ ppp). On Friday, after the programmed stop of PS and PSB, it was restarted with reduced intensity, $2.8e13$ ppp, to satisfy the requests for the targets sharing. During the weekend, SFTPRO was stopped frequently from the SIS due to normalized losses larger than thresholds on ZS3. After investigation, it was discovered that the server of the ZS motors was down since Friday. It was rebooted, but apparently some of the anode positions had drifted. All was brought back to normal, but this needs follow-up.

On Wednesday, dedicated slow extraction MDs took place: SE with octupoles, SHiP cycle setting up, crystal ZS shadowing and ripple compensation using main quadrupoles. The new test BDF target was not put in place and the beam never reached T6 properly. The main issue was found during the steering to T6, as high losses were provoked in TT82. It was then decided that for the next MD the steering has to be carried out the evening before. The HI MD of Thursday also was very successful giving clear insights on transverse instability thresholds and also on the effectiveness of the reconfigured machine octupoles.

Concerning the radiation level increase in T6, **H. Vincke** asked whether the location of the losses was known and if they could start the steering with lower intensity. **V. Kain** answered that the precise location of the losses was not known, and that a minimal intensity was required due to diagnostics sensitivity. **M. Fraser** added that the intensity should be kept above a certain level, but the duty cycle could be reduced. H. Vincke added that the radiation level went from 15 to 600 μ SV/h in the ejection area. During the night tests, the area will be closed.

North Area

B. Rae said that it was a very good week. The radiation level issue is being followed up.

North Area Users

There was no report.



AWAKE

E. Gschwendtner said they took protons beginning of last week. AWAKE will take beam again in 2 weeks' time.

CLEAR

There was no report.

LHC

E. Metral said that the 150 fb-1 target for Run2 was achieved and that they were presently at 57 fb-1 for this year (target for 2018 being 60 fb-1). Today, the LHC has a test planned for 12 hours with high beta at injection. Thursday will be dedicated to ion cycle optics studies.

TI

C. Pruneaux said there was nothing special to report.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

The LHC team was asked to provide the list of requested beams for the LHC MD block 4.

H. Bartosik said that the SPS dedicated MD was split. A first part taking place tonight from 8.00 PM for 4 hours. The 4 hours will be subtracted from the MD time on Wednesday during which the SPS MD will be fully dedicated.

4. AOB

- The maintenance of the PS YEA01.PSR=152 access door was approved ([Annex 17](#)).

Next Meeting: Tuesday 9th October 2018.

Minutes reported by [JB. Lallement](#) on 4th October.



Summary of the 33rd FOM Meeting

Held on Tuesday 9th October 2018

Agenda <https://indico.cern.ch/event/763402/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Schedule update*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 32nd FOM](#) were approved.

2. Status of the machines.

Linac2, Linac3

R. Wegner reported the status of the linacs ([Annex 1](#)).

Linac2 had a week with 99.3% availability. There were two beam interruptions due to a trip of tank2 and to a vacuum pump that broke on tank1 (the vacuum interlock had to be moved to another pump). The decision taken yesterday to increase the source arc current resulted in a slight increase of the beam intensity at the end of the linac.

On Friday morning the Linac3 source RF tripped and could be reset. Over the weekend, the source RF tripped a few times and a faulty connection of the LLRF on tank3 was fixed. The source required frequent tuning to stabilise the beam intensity.

Linac4

B. Mikulec reported the status of Linac4.

The Linac4 beam commissioning was completed last week. The source was caesiated on Friday. Good progress was made and some issues were identified with modulator trips and cavities. Regular beam measurements and AFT statistics will start very soon.



LEIR

M.E. Angoletta presented the status of LEIR ([Annex 2](#)).

LEIR had a pretty good week. NOMINAL and EARLY beams were sent to the PS from Wednesday to Friday and EARLY to the SPS on Friday. During that period, LEIR NOMINAL was at the LIU-required performance for 12 hours (9E10 charges were extracted on average, for an accumulated intensity of about 10.5E10 charges). Several MDs were carried out, such as triple harmonic operation with two cavities and further cooling studies, in particular, for IBS measurements. Problems were experienced with the control of the HLRF (Finemet cavities). The operational cavity for this run is the CRF41, but the CRF43 was switched on for MDs, too. Both cavities showed non-resettable faults with their power supplies and the EPC piquet had to be called at different times. In particular, on Thursday afternoon the CRF41 cavity kept tripping. This was due to the combination of several problems and it seems that, although no beam was captured, the radial loop could see some sort of radial position and was dragging the frequency to the cavity outside its normal frequency range. On Friday morning the beam was restored and a protection was added to the LLRF, to limit the frequency coming from the radial loop to a maximum of 5 kHz. The consolidation of the power supply, initially scheduled for LS3, should be anticipated to 2021.

PSB

V. Forte reported on the PSB status ([Annex 3](#)).

It was a pretty good week for the PSB with 95.9% availability for ISOLDE and 99.2% for the PS. The main downtime for ISOLDE beams came from an issue with the ISOLDE SEMgrids, which was solved by BI experts through a recompilation of the related FESA class. This fault was blocking ISOLDE to perform the proton scan. An issue was found with the R1 C16 cavity gap relay and will require a 30-45 minutes stop. The PSB operation team was prompt to react to very last-minute requests for HiRadMat on Friday afternoon/night. There was very good progress for reference measurements (MD4544 family), which started this week and will continue in the incoming weeks.

ISOLDE

S. Mataguez reported the status of ISOLDE ([Annex 4](#)).

It was a very good week at ISOLDE, target and machine behaved very well and users were really happy. 22 new isotopes of Sb ions were delivered to COLLAPS from Tuesday. The HRS Tape station broke on Wednesday, and an intervention will be planned.

ISOLDE Users

K. Johnston confirmed it was a very good week for the experiment at ISOLDE during which COLLAPS were measuring the hyperfine parameters of numerous Sb isotopes: charge radii, spin states and quadrupole moments. 22 new isotopes were fully measured from 112Sb to 134Sb with very stable yields and running conditions. The only isotope which remained out of reach was 135Sb, but this will require a different ion source for it to be reachable. The main experimental goals of the experiment were achieved.



PS

H. Damerau reported the status of the PS ([Annex 5](#)).

The PS beam availability was 95%. A fault on the bumper BSW41 on Monday required an intervention by the power Piquet. All fast extracted beams could not be delivered during 1h30, while the EAST beams were available after 0h50. On Tuesday the horizontal wire scanner in SS68 was blocked in an undefined position. The stop for the access took significantly longer than foreseen, due to an issue with the RP veto of the access system, which could only be removed by the specialist after 1h15. The wire scanner was moved manually to a safe position, but the wire was found broken. The total downtime for the access accumulated to 3h15. Following a number of short resettable trips during the previous week, POPS did not restart on Wednesday. The power Piquet solved a problem with a ventilator, which allowed to restart POPS after 1h30 stop. POPS has been running smoothly since. A ventilator was also replaced in the power converter of ZT10.BVT01 (1h00 downtime). Due to frequent trips of the 80 MHz cavity C80-88, the third 80 MHz cavity (C80-08) had to be tuned for protons on Saturday to deliver LHC-type beams. The bunch rotation of the nToF beam has been optimized. Following a test with nTOF on Wednesday, this seems to reduce the previously observed pre-pulses of the gamma-flash. The modified beam is delivered to nToF since.

Answering a question from **B. Mikulec**, **H. Damerau** said that the wire scanner issue was not understood.

East Area

B. Rae said it was a good week.

East Area Users

H. Wilkens said that the users were happy.

nToF

M. Barbagallo confirmed they were happy with the present nToF beam settings.

AD - ELENA

B. Lefort reported the status of AD ([Annex6](#)).

After 4 weeks without beam, the AD team is now ready to restart the E-cooler in the afternoon and the operation should resume tomorrow. In fact, the vacuum is now OK after the collector was replaced by the spare.

After issues encountered with the ELENA source transformer, TE/EPC decided to fix the transformer by themselves by applying a few design modifications. The source operation should resume tomorrow.

J. Ferreira commented that the fact that the FSU were not able to work over the weekend did not really delay the restart due to the parallel pump-down and that the collector replacement took only 1 week this time instead of 2 weeks the previous time.



AD users

H. Wilkens said that given the time lost with the collector issue, they will present a formal request to the SPSC to extend the AD run.

SPS

V. Kain reported the status of the SPS ([Annex 7](#)).

Until the weekend the SPS had a very good week in terms of faults. The main downtime had been caused by the injectors until then. On Saturday however the 800 MHz cavity 1 caused down time of almost 3 hours for the LHC due to a cabling issue that had been accidentally introduced in the morning after the HiRadMat run and all beams were stopped on Sunday for about 2h40 due to a broken GTO trigger module of the SPS dump kickers. The COMPASS spectrometer magnet is down since Sunday afternoon.

On Monday afternoon the HiRadMat43 run started and was successfully finished in the night from Monday to Tuesday with the last 288 bunch shot of the year to HiRadMat. On Tuesday the LHC had the preparation of the high beta run and in the evening low intensity MTE beam was successfully steered to the T6 target with the SHiP optics. On Wednesday the BDF target took beam during the dedicated MD. $5e15$ POT out of the $3e+16$ POT required in total could be accumulated. In parallel shadowing the ZS wires with a bent crystal was successfully tested. With the optimum alignment, beam channeled by the crystal can reduce the losses by $\sim 40\%$ in the extraction region. On Thursday, Q22 high intensity beam was taken. It is more prone to instabilities than Q20 and was longitudinally unstable without controlled longitudinal blow-up towards the end of the ramp above $1.8e+11$ ppb in four 12 bunch batches. On Thursday evening, HiRadMat46 was started. It required about 2500 shots at various intensities (single bunches to 25 ns trains with $3e+10$ to $1.2e+11$ ppb), but always 2.5 mm.mrad emittance. The SPS injectors did a great job delivering all these beams. The experiment was running until late Thursday night and then through Friday night, exploiting the LHC cryo downtime. It was finished on Saturday morning, and with it, the 2018 HiRadMat run.

North Area

B. Rae said that besides an issue with the access system that lasted 2 hours and the COMPASS spectrometer magnet problem already mentioned, the week went pretty smoothly.

North Area Users

H. Wilkens asked whether there was any issue with the radiation level in the North Area during the HiRadMat run. **V. Kain** answered that there was no issue at that time as the bends were off. **H. Wilkens** also asked what could be the impact of the LHC MD program on the fixed target beams, as the previous LHC MD was quite dramatic for the NA. **B. Mikulec** answered that the exact program will be known next week. He added that beside the problem with the spectrometer magnet, the COMPASS experiment also found an issue with the vacuum in their target. It is being followed up.



AWAKE

There was no report.

CLEAR

There was no report.

LHC

E. Bravin said they had a pretty low availability mainly due to 30 hours lost because of a Cryo loss in point 8 followed by the problem with the 800 MHz SPS cavity. 3 fb-1 were nevertheless provided. They will have a low beta run and a van der Meer scan next week. The beam requests were sent to the injectors.

TI

R. Ledru reported on the BA82 water cooling stop that was caused by a user intervention without pre-warning. He reminded that any intervention consuming cooling water should be first communicated to TI.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

The LHC schedule was updated ([Annex 8](#)). The special physics run will start tomorrow. The MD4 block was extended to 7 days.

The MD4 beam requests ([Annex 9](#)) were given: 8b4e and 12 bunches high intensity BCMS, partially stripped ions, high intensity INDIV and Nominal 48 bunch train.

H. Bartosik commented that it might be difficult to provide the 8b4e with high intensity with the ZS limitations. Tomorrow's MD is dedicated in the SPS (Crab cavity) – No beam in the NA. A special test will take place in the PS from 8.00 AM to 9.00 AM (no beam for the PS users) and no beam for the East Area from 1.00 PM to 5.00 PM.

4. AOB

- The maintenance of the YEA03.PSR=151 access door was approved ([Annex 10](#)).



Next Meeting: Tuesday 16th October 2018.

Minutes reported by [JB. Lallement](#) on 11th October.



Summary of the 34th FOM Meeting

Held on Tuesday 16th October 2018

Agenda <https://indico.cern.ch/event/764990/>

- 1. Follow up the last FOM*
- 2. Schedule updates*
- 3. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 33rd FOM](#) were approved.

Linac2 & Linac3

F. Di Lorenzo reported on the linacs ([Annex 1](#)).

Linac2

Linac2 was running quite well with 18 flash-overs during the week.

Linac3

Linac3 was running quite well. On Thursday **D. Kuechler** did the re-fill of the oven at the Linac3 source. The source tripped on Saturday (13th of October) around 2h00 and was restarted by **D. Kuechler** around 6h00.

Linac4

B. Mikulec reported on Linac4 ([Annex 2](#)).

Very good progress in understanding some long-lasting issues of Linac4.

The linac tripped several times per day due to transmission losses (watchdog). These losses were finally identified to be due to sudden movements of the tuners that received a spurious signal from the cavities, resulting in a power increase and voltage drop of the affected cavity and subsequent beam losses. On Friday (12th of October) in the late afternoon, **B. Bielawski** deployed a software filter that suppresses these tuner movement spikes. Since then not a single watchdog trip occurred. There were also many RFQ trips recently due to spikes of reflected power leading to voltage drops and discharges in the RFQ. In order to protect the cavity, the modulator tripped. It is believed that this was due to beam losses in the RFQ, as the RFQ acted as an aperture restriction. Last week the RF team had decreased the switch and limit to prevent high power RFQ trips, which also reduced



significantly the RFQ/modulator trips despite an increase of the source current on Thursday (11th of October). The longest-lasting fault of 7.5 h happened on Thursday (11th of October) when an FGC62 power converter of a corrector magnet tripped with a fault, which blocked the WIC and therefore the BIS. The piquet changed a faulty electronics board, which then led to a failure of the FGC3 module. The EPC team then tried to exchange this module, but of all modules present as spares in the linac none was functional (to be followed up by TE-EPC). Finally, the team could replace the faulty module with one from its lab. Linac4 was running since Wednesday (10th of October) evening with the nominal chopping pattern without issues. It seems that between these short chopping pulses the chopping inefficiency is around 3%. It still had to be checked whether this un-chopped beam would or not be transported to the PSB where it would be lost at injection, or if some settings could be optimised to improve the chopping efficiency. While going around the hor. bending magnet in the transfer line, it was observed that there was a significant energy variation along the beam pulse. This issue still has to be followed up. Improvements were made on the controls level to handle multi-cycle operation.

LEIR

N. Biancacci reported on LEIR ([Annex 3](#)).

The week was excellent for LEIR, with high availability (almost no faults) and remarkable results were achieved. A follow-up of the investigation on radial loop pickups issue: The radial position was measured as the average of two TPUs, namely TPU1 and TPU2, which were PU 32 in the ring and PU 31 in the ring. The radial loop could be closed on average on TPU2, but not on TPU1. This was back tracked to a bad connector on the beam orbit crate. The delta signal was not received. The connection was fixed. An additional problem was also found: The TPUs were cabled inverted in the LLRF, as well as their calibration factors. This was fixed with negligible impact on the performance. The oven was refilled on Thursday (11th of October) and the beam was immediately recovered afterwards with no relevant issues. After switching back to coupled mode, from the Linac3meas cycle in standalone, **D. Kuchler** detected a sudden loss in the transmitted current. The Tank3 settings were found different resulting in different energy/transport, which is still under investigation. During the source refill an access was made to identify the source of the vertical LEIR instability. The UQFHV41 (BTF pickup) was reconnected this time and the beam went unstable again. This pointed without doubts to this device as source of the instability and the next steps were a re-measure in detail with VNA, and definitely disconnect it. The EARLY beam was completely re-optimized in order to overcome the losses at capture present since the last few weeks: an optimization of the cooling working point was essential. The transfer line transport to LEIR was re-optimized in order to reduce to 5-10% the total transport losses (> 30% before). The EI.BPMI30 is now connected to a high frequency system to compute the position (the other transfer line BPMs work at low frequency). This had been proved to be immune from electrode charging. The systematic logging of the position at this location already helped us in detecting an issue in the EI line during an unwanted trim to the nearby correctors. On Friday (12th of October), very good and high intensity beam was provided to the SPS. A quick tune of the transfer to PS was necessary. During the weekend (w41), the very stable 33uA current from Linac3 translated in continuous LIU beams from LEIR ($N > 9e10$ on average for the Nominal cycles). Only minor faults were reported.



PSB

F. Antoniou reported on PSB ([Annex 4](#)).

A very good week for the PSB with a machine availability of 99.5%, corresponding to a total downtime of 46 min. was presented. There happened only 2 trips. A trip of the B11.QNO50 lasted 46 min. and required the change of the control power supply. Otherwise, the beams requested for the LHC MDs were successfully prepared and as usual, there was an eventful MD program with several machine studies like resonance compensation, emittance measurements, the Finemet cavity setup, horizontal instability studies and transverse feedback studies. The reference measurements continued also during this week (w42).

ISOLDE

E. Siesling reported on ISOLDE ([Annex 5](#)).

A very successful week at ISOLDE was presented. The focus was on the GPS run for the ISOLDE solenoidal spectrometer at the second HIE ISOLDE beamline, where very heavy $^{206}\text{Hg}^{46+}$ at a maximum energy of 7.38 MeV/u was sent since Wednesday night (10th of October). The difficult setup with a very temperature sensitive Pb target using the max number of STAGISO cycles from PSB was successful. (Many thanks to the PSB OP team for always keeping the max number of STAGISO available!). With one of the electrostatic quadrupoles at the front-end of GPS out of order, the setting up and tuning of the beam through the low energy part became particularly difficult, but after a few iterations and also retuning of the RILIS lasers to optimise the ionisation of the ^{206}Hg , it was possible to improve the production and overall transmission. The users received at best $1.2\text{E}6$ pps at their setup, which was even slightly higher than in their (over-estimated) proposal. The users were very happy with the nice spectra they saw. The run was stopped on Monday morning (15th of October) and the preparation for a negative ion run on GPS planned for later this week (w42) was started. Also, a MEDICIS target was irradiated and there were some tests done from GPS to the new GANDALPH setup at LA1. A few issues occurred with the GPS QS30 quadrupole horizontal plane focus that is out of order, which made low energy tuning difficult. The RILIS edge-wave pump laser broke on Friday afternoon (12th of October), which caused a downtime of 4 h to have it replaced by the spare. This new RILIS setup had then a few hick-ups during Friday night (12th of October) with a humidity and water flow interlock. Once solved the weekend was very smooth with lots of data for the users.

ISOLDE Users

K. Johnston reported for the ISOLDE Users and sent an email:

This was the second experiment at the newly commissioned Solenoid spectrometer at ISOLDE, in this case ^{206}Hg @ 7.4 MeV/u. This was a challenging experiment both in terms of beam delivery and for the experiment as it was probing an area in nuclear physics where relatively little is known: it is uniquely possible at ISOLDE and using the energies that HIE-ISOLDE can deliver. The data obtained by the experiment were excellent with clear statistics and many new states beyond ^{206}Hg were measured. The experimental team would like to acknowledge the work from the ISOLDE



teams for delivering this beam and also the booster for ensuring that the protons were as stable as possible in spite of all the machine development taking place elsewhere.

It should be pointed out that the maximum energy of 7.4MeV/u is due to issues affecting the HIE-ISOLDE cryomodules and is still at the edge of feasibility for these types of experiments. 10MeV/u would allow for more spectroscopic information and should be available after LS2 once the necessary repairs have been carried out. Otherwise an excellent week.

PS

K. Hanke reported on the status of the PS ([Annex 6](#)).

A good week for the PS with >96% availability was shown. There were a number of RF trips throughout the week, but not causing a significant downtime. Most of the downtime was associated with power converters. On Monday (8th of October) the wire scanner 65H was made again operational by the BI expert (front-end power supply change). On Tuesday (9th of October) cavity 80-08 was tuned for ions. There were also short trips of KFA13 and KFA21. On Wednesday (10th of October) ions were set up to the East dump. In the evening, there was a 44 min. stop due to the PSB (R1). Thursday (11th of October) there were power problems, first a 1h42 stop due to the PR.WFNI + PR.WFNP, and then later again 41 min. downtime for the same problem. Later a 10 min. trip of the POPS occurred. The wire scanner 65H was blocked in an unknown position (not in home, but not in the beam either) and the BI expert advised the team not to use it until they have checked it. Friday (12th of October) a 2h11 downtime due to F61S.QFO01, required a First Line intervention. The rest of day and the following weekend (w41) was very quiet, with some RF and PFW resets. The increasing frequency of the trips of C11 should be noted, which needed to be looked into by the expert on Monday (15th of October). The wire scanner 65H was declared operational by BI and used during MDs on Friday (12th of October) afternoon. On request of the LHC the OP team set up BCMS with 1.4e11 and also checked 8b4e. The nTOF curve was well above the target.

East Area

N. Charitonidis reported on the East Area.

A very nice week was reported. The only issue was a misreading of a wire chamber, which was fixed by BI. There is no BI contact for East Area as the PS operation team reported.

East Area Users

There was no report.

nTOF

D. Macina reported on nTOF.

The integrated luminosity was very good. Only on Saturday (13th of October) the radiation alarms were reached. The first time the question was asked if it would be better to take more bunches with less intensity, which was possible due to the fact that there were free slots available. Depending on



the experiment, it could be better to have more less intense bunches, which was the case on Saturday (13th of October).

AD-ELENA

AD

L. Ponce reported on AD and ELENA ([Annex 7](#)).

The week was dedicated to restart the e-cooler and physics beam in AD. On Monday (8th of October), the vacuum activity was completed after a leak detection, then the e-cooler was reassembled and the first HV test could be performed in the evening. Tuesday to Thursday (9th to 11th of October) were dedicated to conditioning the e-cooler. The nominal voltage of the e-cathode was reached on Thursday evening and the valves could be opened and beam was injected. The cooling was checked and the first beam was extracted. The physics resumed on Friday (12th of October) with 2.8-3e7 pbar extracted and 80% deceleration efficiency. Over the week-end (w41), an issue with C10 cavity (not noticed by users) and two issues with GEM (not reaching IN position for ALPHA and AEGIS) were reported. Five users took beam over the WE (ALPHA, ATRAP, AEGIS, BASE and ASAKUSA) and ELENA/Gbar took the beam on Friday (12th of October). During the night from Monday to Tuesday (15th- 16th of October) BASE took the beam, which had to be reduced by one third because the radiation alarm was triggered. The temperature on the target was good.

ELENA

T. Eriksson reported on ELENA.

ELENA was happily taking beam for Gbar. Commissioning has restarted. The remaining weeks are alternated between commissioning and taking beam.

AD/ELENA Users

There was no report.

SPS

H. Bartosik reported on the status of the SPS ([Annex 8](#)).

It was a quite good week for the SPS with a beam availability of about 93%. Since Thursday (11th of October) the LHC was taking INDIV beams for their high beta run at 450 GeV, which required relatively frequent refilling. Nevertheless, the impact on the North Area physics could be kept minimal. Since Sunday (14th of October) evening the BCMS beams are requested by the LHC for physics production. At the first extractions of 48 bunches the interlock BPM reference positions had to be slightly adjusted. In addition, some issues with losses at the PS-to-SPS transfer were encountered, possibly linked to a cavity issue in the PS. The accumulated intensity on the SFTPRO beam was good this week. However, for some period on Tuesday (11th of October) reduced intensity on T6 was requested by the users due to a problem with the spectrometer of COMPASS. Furthermore, it should be mentioned that there was a problem on the databus of the North Area



power converters on Friday (12th of October) evening/night resulting in inverted polarities on several converters in BA81 (as occurred already a few weeks ago). This could be fixed only after several hours by the piquet who replaced a broken cable using the one of a presently unused power converter (PC NR11_084) due to lack of spare cables. This converter was presently out of order, but will be made available again by the specialist. Lots of progress was made on the preparation for the ion run. On Tuesday (9th of October) the basic setting up of the SFTPRO prototype cycle was completed. On Friday (12th of October) the long LHC ion filling cycle (with a maximum of 12 injections from the PS) was played and set up for the first time. Up to 3 batches could be accelerated successfully to flat top. However, the interlock on the maximum current of the QD main quadrupole was triggered after a few hours of running in the same configuration (this power converter was at the limit for the 450 GeV cycle in the Q26 optics) and tripped the mains twice. This will be followed up by the EPC specialists early next week (w43).

During the dedicated MD on Wednesday (10th of October) 25 ns beams of variable intensity were taken with crab cavities. Strong pressure rise in the vicinity of the cavities were encountered and required some scrubbing. Nevertheless, important measurements of induced voltage and the a3 RF multipole components of the crab cavities could be taken. The long MD on Thursday (11th of October) was devoted to the studies of the horizontal instability with BCMS beams of 2e11 p/b. It was observed that the beam suffers a deadfall instability with coupling along the bunch train. The instability growth rate could be reduced by optimising the damper settings at 20 MHz.

Main faults of the SPS this week were recurring BETS issues on Monday (8th of October), which could be finally resolved by exchanging the GTO switch trigger unit of the MKD. A problem with the thyatron heater of the MKP generator 1 required the exchange of an electronics control card and in SMD9, one of the main dipole power converters, was out of order (till LS2) as it broke during a trip of the mains on Friday (12th of October).

B. Mikulec asked if for the North Area physics the setting up time for LHC MDs was included in the calculation of their overall proton share.

H. Bartosik answered that he does not think that it was included.

B. Mikulec summarized that a least some time should be allocated in the schedule, although it is not easy to predict.

H. Bartosik mentioned the fact that on Thursday (18th of October), there would be no beam for the North Area due to the preparation of an LHC MD cycle (8b4e; see schedule updates).

K. Hanke pointed out that the long ion super cycle was surprising for the PS and has an important impact on the physics program.

H. Bartosik said that the setup had been announced. The cycle was played the first time on Friday (12th of October) and some setup time is needed, as the LHC starts to take ions in two weeks.

B. Mikulec said there should also be time allocated for the ion beam setting up in the schedule.

E. Siesling added that ISOLDE also suffered from the situation by receiving only 30% of the number of cycles, which should be 40%.

J. Wenninger said the ion cycle was very long and the LHC wants all the bunches. If there would be one injection missing in the scheme the efficiency has to be evaluated.

H. Bartosik replied that the cycles are always were very long and this issue was not new, but the performance of LEIR was much better than in the previous years.

H. Damerou asked about the vacuum quality for the ions in the PS.



J. Somoza Ferreira mentioned that lifetime measurements should be carried out by OP like in the past, as TE-VSC cannot measure such low levels, to see if an improvement was needed through sublimation.

B. Mikulec finalized that a long-term action for **R. Steerenberg** should be opened to discuss how to include and optimize setup times at different moments in the year in the Injector Schedule.

North Area

N. Charitonidis reported on the North Area.

There was an issue with the polarity of some power converters, which caused some downtime for the whole North Area. Another issue was mentioned concerning the spectrometer for COMPASS. This caused a four-day downtime and was fixed on Tuesday (9th of October). There will be a more detailed report on this.

North Area Users

There was no report.

AWAKE

M. Turner reported on AWAKE.

On Monday (15th of October) AWAKE started to take protons, also over the night. A 24 h data acquisition run was performed. On Wednesday (17th of October) a major intervention of the laser system was foreseen. This intervention might have an impact on the operation and continues possibly until Saturday (20th of October). The long ion cycle was also affecting AWAKE and a solution should be found for this situation.

CLEAR

A. Curcio reported on CLEAR ([Annex 9](#)).

Interventions during this week were targeting the alignment of the beamline and the installation of the setup for irradiation experiments. The beamline had been interrupted for hosting the irradiation experiments in the middle of the linac where a tight focusing of the beam could be achieved. No major issue was reported. An irradiation experiment with users from Strathclyde University was planned.

LHC

J. Wenninger reported on the LHC.

The LHC had a very good low energy run. The unwanted side effect was observed, that many faults were accumulated with beam at low energy, which only became visible once the ramping was active. The cryogenics in point 8 showed a lot of problems this year, and on the weekend (w41) a filter had to be de-clogged, which took 24 h. Before another very busy MD week will start (w43), the LHC will be in normal production mode.

B. Mikulec emphasised that the tardy publication of the LHC MD program complicates the setup of beams in the injectors and might lead to beam quality issues.



TI

Nothing special to report (**J. Nielson**).

2. Schedule updates

B. Mikulec said that **R. Steerenberg** is planning to update the Injector schedule following the change of the LHC MD schedule, which was not available at the moment of the presentation.

H. Bartosik said that on Wednesday (17th of October) there was the crab cavity MD planned and there will be no beam for the North Area. The PS complex physics users can take beam normally. In the afternoon, the beam will only be cut for the East Area for a couple of hours. On Thursday (18th of October) the preparation for the LHC MD with 8b4e beam will take place and there will be no beam for the North Area (8h00-16h00).

B. Mikulec continued that the MD block of LHC starts on Wednesday (24th of October). The week after (w43) the COLDEX run starts, which demands a planning by **H. Bartosik** and **V. Kain**.

3. AOB

The access maintenance request at the access point of AD on Wednesday, 17th of October from 08h30 to 17h00 ([Annex 10](#)) was approved.

Minutes reported by [S. Hirlander](#) on 21st October.



Summary of the 35th FOM Meeting

Held on Tuesday 23rd October 2018

Agenda <https://indico.cern.ch/event/767078/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Schedule update*
- 4. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 32nd FOM](#) were approved.

2. Status of the machines.

Linac2, Linac3

JB. Lallement reported the status of the linacs ([Annex 1](#)).

The Linac2 RF tripped Friday night due to the loss of the Switchyard patrol. It was restarted 3 hours later.

The Linac3 stripper foil was changed on Friday and the source required a few resets and adjustments over the weekend. The next oven refill is scheduled on Thursday.

Linac4

B. Mikulec reported the status of Linac4 ([Annex 2](#)).

The Linac4 low energy beam stoppers were grounded to remove latency of beam return after their removal. The ion source was caesiated on Friday. The RF team has deployed a SW workaround to filter out fast tuner movement observed in the last week that led to beam losses. TE-EPC reconfigured the Linac4 FGC3 modules used as spares for the FGC62 power converters to make them again operational. The bunch shape monitor 1 seems broken and investigations are ongoing. No RFQ trip occurred since the RF team had adapted the voltage limit of the klystron.



LEIR

R. Alemany presented the status of LEIR ([Annex 3](#)).

LEIR had a very good week and good availability. The LIU intensity target was reached at the beginning of the week, but the performances slightly degraded since then mainly because of a Linac3 performance degradation over the week and changes in the Super Cycle that modified the stray fields. During an MD, it was demonstrated that the beam momentum could be increased by 5% before the RF capture by using the E-cooler.

PSB

B. Mikulec reported on the PSB status ([Annex 4](#)).

A very good week with 98% availability mainly due to the 3 hours lost for the Switchyard patrol on Friday night. The special beams are prepared and checked for the LHC MD4 block. The list of MDs that took place was given.

ISOLDE

M. Lozano reported the status of ISOLDE ([Annex 5](#)).

It was a good and productive week at ISOLDE without any major issues.

On the GPS side, the machine was set up for negative ions and delivered ^{211}At to GLM (IS615) where the users managed to measure the electron affinity of astatine. Besides the 3 hours stop on Friday night, the operation was stopped for 45 minutes due to an interlock on the cooling circuit. The scheduling of the ISOLDE target change, next week, will be discussed offline with **G.P. Di Giovanni**.

M. Amarilla commented that the cooling circuit interlock was a side effect of a test requested by **A.-P. Bernandes** that should have been transparent to operation.

ISOLDE Users

K. Johnston confirmed it was a very good week.

ISOLDE was delivering negative ions to the Gandolph setup which allows for the photodetachment of negative ions. Astatine is the rarest element on earth and many of its fundamental chemical properties are unknown such as electronegativity and electron affinity. It is also a promising isotope for nuclear medicine for alpha therapy, but is currently limited due to a lack of knowledge of such properties. The experiment ran for most of last week and good yields and stable conditions allowed very good statistics of the photodetachment of ^{211}At to be measured. This will allow for a clear measurement of the electron affinity and from this the electronegativity of At will be known for the first time. The experiment completed their foreseen program.



PS

H. Damerau reported the status of the PS ([Annex 6](#)).

The PS had an availability of about 93% for most user beams with the exception of the T11 beam line of EAST North where no beam could be sent during the night from Wednesday to Thursday for almost 10 hours due to a problem with the access system, which has only been solved on Thursday morning. During the night from Friday to Saturday the access door YEPZ02.SWY=351 between Linac3 and Switchyard was forced. A patrol of the sector was required to resume beam operation. The event stopped the PS for in total 3h10. On Sunday morning the power converter of the extraction bumper PE.BSW14 tripped. The trouble-shooting turned out to be difficult and caused 5 hours downtime for all fast extracted beams including the fixed target beam. Several trips of the pole face windings due to their regulation were again observed (regulation was changed during the technical stop). For the upcoming MDs in LHC and SPS various beams have been prepared and checked: a high-intensity 8b4e beam with 48 bunch batches at PS extraction, 12 bunches spaced by 25 ns with a very high intensity of up to $2.5E12$ p/b, as well as a variant of the BCMS with 24 bunches for an MD in the SPS.

The nToF integrated intensity statistics are still on good track (6% above the prediction). The optimization of the bunch rotation solved the issues observed in the previous weeks.

East Area

L. Gatignon said it was a good week beside the problems already mentioned. The CLOUD experiment is starting the dismantling.

East Area Users

H. Wilkens said that the number of cycles delivered to the East Area was relatively low. The basic Supercycle should have an EAST-North every 15 basic periods and an EAST-Irrad every 10 bp. Last week it was more like 1/15 bp to both destinations and the situation was still ongoing. It will be discussed with the PS operations team.

nToF

D. Macina said everything went fine.

AD - ELENA

P. Freyermuth reported the status of AD ([Annex 7](#)).

The AD performances were recovered and the week was excellent without any fault to report. Fine-tuning in the PS allowed to increase the proton intensity up to $1450 E10$ at the target.

Concerning ELENA, **T. Eriksson** said that the E-cooling was working pretty well resulting in good transverse emittances. They still observe losses during the last ramp and reached up to 60% efficiency. Reason for these losses could be stray fields from various sources. The ion source is not operational yet, as sparks in the transformer damaged it, which is a real pity as no Pbar shift is planned this week. The Gbar experiment observed beam sizes 4-5 times larger than expected. Next week will be dedicated to studies on the transfer line and improving the efficiency.



AD users

H. Wilkens said that the run extension was rejected by the SPSC, as they considered that an extension of the AD run would push the LS2 critical path. The ALPAHA-g experiment will be cooled down this week and may still achieve a measurement of the sign of the gravitational constant for anti-matter.

SPS

H. Bartosik reported the status of the SPS ([Annex 8](#)).

It was a good week with 90% availability. A problem with the North Area access system on Tuesday stopped the North Area beam for about 1 hour and about 1.5 hours downtime were accumulated due to a fault on the TX5 of cavity 3 on Sunday evening. All beams were stopped on Friday during 4 hours for an EPC intervention on the SMD9. LHC fillings were difficult over the weekend with issues with injections into the SPS and losses during transfer to the LHC.

The LHC MD beams preparation is ongoing as well as for the LHC ion cycle.

North Area

L Gatignon said it was a smooth week. The intensity on H4 will be increased.

North Area Users

H. Wilkens said that, due to the preparation of the LHC MD and to the fact that AWAKE was running, the amount of FT cycle this week was pretty low. The NA62 experiment acknowledges the excellent performance of the SPS in terms of 50Hz ripple on the extraction rate.

AWAKE

E. Gschwendtner said that AWAKE also suffered from the LHC MD preparation.

CLEAR

There was no report.

LHC

M. Solfaroli said there was nothing special to report.



TI

J. Nielsen reported on the last week's events ([Annex 9](#)). The trip of the NA cooling station on Tuesday was due to an unannounced filling. The reason of the main SPS trip is being investigated by EPC. The AD tripped on Tuesday because of the activation of an emergency button. The prompt intervention of people after the explosion of a capacitor in BA3 was acknowledged.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

The LHC MD will start tomorrow morning at 7.00. **H. Bartosik** said that the SPS MD will last 13 hours from 8.00 to 21.00 (T6 target test in the NA). During the MD, duty cycle for FT will be limited. On Thursday, there will be no special MD in the SPS (has been cancelled) and duty cycle to the NA could be increased. The next week COLDEX run program is the following:

Wed 31.10.

- 8:00 beam stop
- 8:30 access to move COLDEX in
- from 9:00 start beam for COLDEX

Thurs 1.11.

- 6:30 beam stop
- 7:00 access
- 8:00 resume physics

E. Gschwendtner and **H. Wilkens** asked **M. Solfaroli** to share the LHC MD planning in order to estimate the impact on their program (a link to the program will be uploaded on the FOM page). It was also asked, for future LHC MDs, to have an estimation of the impact on the SPS users well in advance.

4. AOB.

- The maintenance of the AD-Ring YEA01.ADR=193 access door was approved ([Annex 10](#)).

Next Meeting: Tuesday 30th October 2018.

Minutes reported by [JB. Lallement](#) on 25th October.



Summary of the 36th FOM Meeting

Held on Tuesday 30th October 2018

Agenda <https://indico.cern.ch/event/768328/>

- 1. Follow up the last FOM*
- 2. Schedule updates*
- 3. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 35th FOM](#) were approved.

Linac2 & Linac3

G. Bellodi reported on the linacs ([Annex 1](#)).

Linac2

Linac2 was running extremely well with 100% availability.

Linac3

Linac3 was running quite well until the night from Monday to Tuesday (29/30th October). The oven was refilled on Thursday (25 of October) and the source ran stable. A new batch of thicker foils (125 and 150 mg/cm²) for further tests was installed. During the night from Monday to Tuesday (29/30th October) a power glitch damaged a solenoid in Linac3 and an investigation was ongoing.

Linac4

B. Mikulec reported on Linac4 ([Annex 2](#)).

An excellent week for Linac4 with an availability of 98.3% was reported. The frequency of the RFQ modulator trips decreased after adjustment of the voltage limit following the klystron/modulator intervention the week before. On Thursday (25th of October) the RF team started investigating the Kalman filter to fight beam loading in the cavities (feed-forward algorithm), which will be essential for good beam quality at PSB entrance. The final tests can only be done during the LBE line run next year. The Bunch Shape Measurement 1 system was again working after exchange of HV boards. The optimum phasing of CCDTL5/6 was still under investigation. Monday morning (29th of October) the Linac4 source tripped and after the replacement of 20 kV capacitor inside the 2 MHz RF amplifier it worked again.



LEIR

S. Hirlander reported on LEIR ([Annex 3](#)).

LEIR had a good week (until yesterday, 29th of October), which was characterised mainly by MDs. On Thursday (25th of October) the Linac3 oven was refilled, and bringing LEIR back to operational mode on Friday (26th of October) did not show any significant problems. The weekend (w43) was calm, and LEIR was running stably. Recovering to full intensity switching back to coupled mode after the Linac3 MD was not possible and investigations were ongoing. The major fault was a power glitch at night (29/30th of October), which brought the cavities (ER.CRF41/43) down. Cavity 41 needed a long repair (final amplifier-blower damaged) and switching to the spare was not successful; further investigation were ongoing. A BPM in the ring did not work and an access revealed that a short-circuit caused the problem, which will be repaired in LS2. The transfer line LEIR to PS for the Nominal cycle was optimised yielding an efficiency of 95%.

On the MD side: A study on LLRF commissioning with the possibility to receive in real time the orbit position was performed, IBS+SC studies of a cooled bunched beam were continued, and tests, trying to compensate the stray fields, were carried out.

PSB

A. Findlay reported on PSB ([Annex 4](#)).

With 99.9% availability, the PSB showed an excellent performance. A known problem when mapping cycles re-occurred on MD2, and the timing experts were aware of this. The problem will be solved with migration to FESA3 in LS2 in any case. A synchro issue with MD_LHC25_8b4e_A_PH was observed, although not with the “B” user or to the dump, so this will be investigated. The week was dominated by MDs.

ISOLDE

E. Siesling reported on ISOLDE.

A quite good week at ISOLDE was reported. A lot of activities without major issues were carried out. For GLM a small issue due to a target change was delaying the setup. On HRS several users were served. The beam was delivered to three different experimental stations without major issues. For high energy ISOLDE the 12C4+ carbon setup had started. On the MD side, a characterization of the phase space was taking place.

ISOLDE Users

K. Johnston reported for the ISOLDE Users and sent an email:

This was a busy week with 7 experiments taking beam: 2 on HRS and 5 on GPS. On HRS ^{26}Na was taken to the upgraded VITO beamline and the improvements in the magnetic field stability have allowed for more accurate measurements of resonances in biological systems. Following this, the first use of the SPEDE spectrometer (used for the spectroscopy of conversion electrons) was



successful at the ISOLDE decay station. ^{182}Hg , ^{184}Hg and ^{186}Hg were measured and the experiment completed their programme. On GPS – using STAGISO pulses – 5 experiments collected ^{111}Cd for solid state physics. This was also successful and the experiments have completed their aims for 2018.

PS

F. Tecker reported on the status of the PS ([Annex 6](#)).

An excellent week with 99% availability was reported. The main issues were simultaneous trips of POPS and PFWs (45 min. downtime) and frequent trips of PFWs due to regulation and the RMS current (many LHC cycles in SC). The cavity 11 10 MHz amplifier tripped occasionally on SFTPRO cycle, and experts were investigating the problem. The ion beams had longitudinal issues after transition caused by a wrong stable phase program due to a broken adapter cable for the detected voltage on harmonic 21. A large activity for LHC MDs, the ion setup and the PS MDs were mentioned.

The predicted nTOF integrated intensity has been achieved eleven days ahead of schedule.

East Area

B. Rae reported on the East Area.

A very nice week was reported.

East Area Users

H. Wilkens reported on the users.

The users are happy, especially in the radiation facility, since they got more cycles than expected. The CLOUD experiment started to change from the program of studying marine conditions to the study of forest conditions.

nTOF

D. Macina reported on nTOF.

The users are happy. Only one thing, which had to be mentioned, was the effort to understand the pre-pulses. A test with **H. Damerou** and **F. Tecker** was performed to see if something can be seen in the wall current RF monitors, which was confirmed. These studies are especially interesting for the commissioning after LS2.

B. Mikulec asked if there was an explanation for the pre-pulses.

H. Damerou answered affirmatively and added, that the observed pre-tails could be influenced by the bunch rotation parameters. This was seen on the PS monitor and on nTOF target and nTOF detector.



AD-ELENA

L. Bojtar reported on AD and ELENA.

AD

AD was running this week well with good intensities. There were occasionally low intensity shots due to work on the injection kicker. Sunday evening (28th of October) an intervention was needed to adjust the e-cooler cathode voltage, the ejection kicker timing and steering in the ejection line. Apart from these smaller issues there were no major HW problems.

ELENA

ELENA made some progress. The efficiency was higher than before. For the first time, it was possible to measure the profile in the extraction line.

B. Mikulec asked if the observed profile was consistent with the expectations.

L. Bojtar answered that it was larger than expected, but not as large as seen at the experiment.

AD/ELENA Users

H. Wilkens reported on the users.

Last week the BASE experiment successfully filled the storage for the pbars for use until next spring.

SPS

F. Velotti reported on the status of the SPS ([Annex 8](#)).

Last week the SPS was very busy with a good availability in terms of faults, but the NA physics was significantly impacted by the LHC MDs. The beginning of the week was devoted to the preparation of the special beams for the LHC, mainly to the very high intensity ($2e11$ p/b) 4×12 bunches. This setting up demanded RF experts working very hard to stabilise it and to make it ready for the injection into the LHC. The SPS dedicated MD was longer than usual, with the 13h used for the test of the prototype of a SHiP-like target for future FT experiments. The dedicated time had to be shared with the LHC as well, as the LHC MD block 4 started the same day. In the end, $2.4e16$ POT were accumulated on the test target in TT25 (T6). At the same time, the test of using a Si bent crystal to reduce losses at the ZS was also carried out for the whole duration of the MD. Again, $\sim 40\%$ loss reduction at the ZS was observed and confirmed the results from the first MD.

During the whole week, a few issues were reported on the RF system. There were several short problems, where only on three occasions the piquet had to intervene directly. One of them, which has to be followed up, was the fact of the observation of the TX5 not delivering any power, but none the surveillance systems showed this. It took quite some time before the issue was identified and solved. After the dedicated MD, the losses on QDA.219, which were increasing constantly since last week, had reached the thresholds. After quite some time investigating, the orbit was found to be the cause. After re-flattening the orbit at extraction on the vertical plane, all returned to normal



and the NA could take finally beam. The other two longest stops were caused, directly and indirectly, by the ZS. First, Friday (26th of October) 8b4e beam had to be delivered to the LHC, hence the SE was stopped to avoid the ZS sparking. This caused in total ~4h of no beam for the NA. Then, over the weekend, a short circuit in the ZS PS needed the piquet intervention in order to restart with physics. The LHC MD beams were much simpler during the weekend, producing no major hiccups. Also a few trips of the mains due to a door that vibrates were reported. On the bright side, it was possible to deliver $1.85e11$ p/b in trains of 4x12 bunches to the LHC - it was tried to go higher, but lack of time and (probably) unrelated RF issues made this test stop.

North Area

B. Rae reported on the North Area.

In K12, NA62 has had some troubles with vacuum in one sector close to the first Gigatracker. They exchanged the gauge, some electronics and finally a connector for a cable. Currently it was running OK again. They lost about 1.5d in total due to this. On Thursday night (25th of October), there was a problem with the access system on H6/H8, which was solved by the piquet (lost ~1h30).

North Area Users

H. Wilkens reported on the users.

The users did not receive as many spills as during a normal week due to the LHC MD.

AWAKE

E. Gschwendtner reported on AWAKE.

There was nothing special to report, as AWAKE received only very few protons.

CLEAR

There was no report.

TI

Nothing special to report (**J. Nielson**).

2. Schedule updates

B. Mikulec presented the injection schedule ([Annex 9](#)).

She asked **H. Bartosik** if for the COLDEX run it was clear which beam was requested.

H. Bartosik answered that the 25ns nominal intensity beam would be used.

He continued that the COLDEX run will start Wednesday morning (31st of October) and the rest of the program will start on Thursday (1st of November). There will be dedicated MDs in the SPS,



hence no beam for the North Area until 18h00. Otherwise there was nothing special foreseen for the lower energy machines. There might be a slightly reduced duty cycle for the physics users.

B. Mikulec said that the LHC MD will stop on Wednesday (31st of November) at 18h00, followed by a technical stop of LHC before the ion run. On the 12th of November, the proton physics ends.

H. Bartosik added that is planned to perform a test with beam in the PSB during the 30-hour cooldown period after the end of the proton physics run on 12th November (to check if the horizontal instability is caused by the impedance of the extraction kickers). Therefore, Linac2 and the PSB are requested to stay operational until 12th November afternoon. This exceptional beam test has been agreed with RP.

R. Steerenberg asked if EN-ACE was aware of this request.

B. Mikulec answered affirmatively that it had been discussed with RP and EN-ACE.

3. AOB

There was no AOB.

Minutes reported by [S. Hirlaender](#) on 30th October.



Summary of the 37th FOM Meeting

Held on Tuesday 06th November 2018

Agenda <https://indico.cern.ch/event/768328/>

- 1. Follow up the last FOM*
- 2. Schedule updates*
- 3. AOB*

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 36th FOM](#) were approved.

Linac2 & Linac3

R. Scrivens reported on the linacs ([Annex 1](#)).

Linac2

Linac2 had a very smooth running. Only a short fault due to the electrical perturbation on Monday (29th of October) night happened.

Linac3 and source incidence

The source stopped during the electrical perturbation on Monday night (29th of October), but could be remotely restarted. One hour later (and unconnected) one of the 1200 A solenoid coils in the source went into open circuit. After diagnostics, on Tuesday (30th of October) at midday it was decided to start a full dismantling to install the spare coil. By the end of Tuesday, the source was open on the support in the tunnel. TE-MSA made a rapid certification of the spare (which was untested for 10 years). On Wednesday (31st of October) morning the (800 kg) magnetic circuit could be dismantled, rotated and opened. By the end of the afternoon TE-MSA could return the spare, and it was squeezed into the yoke. On Thursday (1st of November), the magnetic circuit was remounted and connected to the cooling and power supplies. A fast measurement of the internal field was made and seen to be as expected. By the end of the day the source was pumping. On Friday (2nd of November) morning the vacuum was good enough, and the final reconnection and remounting of the shielding was made. In the afternoon, the source could be restarted for conditioning.

Conditioning was slow and difficult. A preliminary test of beam to LEIR was made on Saturday (3rd of November), and on Sunday (4th of November) the source was tuned continuously to keep it just at the minimum intensity needed for checking out the injector chain. On Monday (5th of November)



afternoon much more stable and intense beam was delivered. A follow-up on reviewing the spares situation (with TE-MS) is requested. A big thank you to all involved!

Linac4

B. Mikulec reported on Linac4 ([Annex 2](#)).

A very good week for Linac4 in terms of availability (98.4%) was presented. The source RF power supply was adjusted after observed RF power (and beam) instabilities (ageing tube). Sensitivity measurements for BCTs and BPMs in view of the post-LS2 commissioning beam were carried out and a min. pulse length of ~120 ns was determined. Stripping foil tests were done every night. The LEBT solenoid tripped on Saturday (3rd of November) evening and an exchange of a high power module and an internal power supply was needed. On Monday (5th of November) at 04h10 the source tripped. The same thing happened exactly one week ago; a 20 kV ceramic capacitor on the input filter of the RF amplifier exploded, which points to the fact that the rating might be a bit tight. This will be reviewed during LS2. On Friday (2nd of November) a cavity loop module was replaced with its revised version on CCDTL5/6 and the phase shifter between the cavities adjusted. Today (6th of November) additional cavity loop modules will be replaced for several cavities that do not yet contain the new version, which will require a rephrasing of the linac this week.

LEIR

N. Biancacci reported on LEIR ([Annex 3](#)).

The night between Monday and Tuesday (29th/30th of October) the Linac3 source failed on the SOLEXT (extraction side solenoid). This required part replacement and source venting. At the same time, in LEIR, the CRF41 had the final amplifier blower damaged due to a power glitch. It was tried to switch the operational cavity to the hot spare ER.CRF43, but it went into resettable fault (screen bias). The reset did not remotely work from the RF PLC, but it was possible from the EPC control panel. The issue required an intervention of both RF and EPC experts and it was back-tracked to a defective communication on the opto-coupler card in the EPC electronics crate. Changing the card fixed the communication issue between EPC and RF panels. On Wednesday (31st of October), the issue on the CRF41 was identified on the pressure transducer that monitors the tube sockets' air flow. On Thursday (1st of November) the RF piquet accessed the machine and repaired it successfully. On Friday (2nd of November) the Linac3 source was successfully restarted, and beam was sent through the RFQ and Tank1. The source tuning continued on Saturday (3rd of November) when 18-21 uA were delivered to LEIR allowing initial tuning at low current. On Sunday (4th of November), the EARLY beam was sent to TT40, TT60. A fault on CRF41 (HT sum) required the piquet intervention. Due to beam unavailability, MD studies were suspended with exception of the WR- Btrain reliability run. On Monday (5th of November) the first beam was sent to the LHC. An issue at capture on NOMINAL due to unstable cavity 1 servo loop settings on the shaping harmonic was found and solved. It was suspected to be related to the intervention on CRF41.



PSB

G. P. Di Giovanni reported on PSB ([Annex 4](#)).

Another excellent week for the PSB week with better than 99% availability was presented. An issue was observed with the extraction synchronisation of ISOLDE beam in Ring4, when using the recently updated firmware of the Finemet cavities. It was reverted to the standard ferrite system while the RF experts were investigating. The operation crew was kept quite busy trying to manage the hectic daily MD schedule, the COLDEX run and the preparation of a last-minute LHC request of a VdM-type beam. The VdM-type beam was needed to repeat the low energy high beta scan, which was requested in order to fill the gap created by the delayed start of the ion run.

ISOLDE

E. Fadakis reported on ISOLDE ([Annex 5](#)).

On HRS: TISD successfully tested a prototype target, which has the neutron converter in the middle and the target material around it. On GPS: the beam was delivered (9Li^{3+}) to the scattering chamber in XT03 from Wednesday (31st of November) until Monday (5th of November) morning. A pilot beam of 12C^{4+} was started, which users used on Monday (5th of November) night to calibrate their experiment. Physics was performed with 9Li^{3+} at 8 MeV/u. This was a challenging beam due to the very light mass of Li and to the fact that stripping foils need to be used to clean the contaminants. Despite a very good overall transmission (~100% for the low energy part, ~4.4% efficiency of TRAP and EBIS and ~74% for HIE LINAC) users were getting around $2.5\text{E}5$ for a 2 uA proton beam current instead of $1\text{E}6$ due to low target production. The line heating tripped twice during these days causing downtime of a few hours. A thank you was given to the PSB colleagues for doing their best to provide the maximum number of protons possible (even on MD day(s)). This compensated, even if slightly, the low target yields and helped to increase the number of particles per second arriving on the experimental station.

ISOLDE Users

K. Johnston reported for the ISOLDE Users and sent an email:

ISOLDE was last week delivering 9Li @ 8MeV/u to the scattering chamber on the third HIE-ISOLDE beamline. The aim of the proposal was to perform $2n$ transfer reactions using a tritium target to explore the excited states of the halo nucleus 11Li . Although the yields of 9Li were perhaps not as high as originally requested by the users, the stability of the machine has allowed good data to be obtained for the first time on the excited states of 11Li . The users would like to express their thanks to the operations team at ISOLDE for the very efficient delivery of beam and also to the booster for maintaining as close to 2uA on target as possible which ensured that the measurements proceeded very smoothly.



PS

I. Efthymiopoulos reported on the status of the PS ([Annex 6](#)).

A busy week for the PS machine with 80.6% uptime according to the AFT tool (total – for all destinations) was presented. The PS delivered beams to all destinations including protons for SPS, nTOF, AD, East Area and LHC as well as Ions (Pb54) early in the week and again on Sunday (4th of November) evening. On Tuesday (2nd of November) morning the bipolar power supply of the extraction bumper BSW22 failed. The origin of the failure was water dripping on the power supply from the roof of the building that short-circuited the power thyristor of the supply. Other elements of the supply were damaged as well from the shock. The BSW22 bumper is part of the PS extraction to SPS that needs to be pulsed in one polarity (negative) for the MTE beam and the opposite (positive) for all other beams (SPS/AWAKE, AD, nTOF, LHC). The spare bipolar power supply was re-cabled in 2015 to the BSW14 bumper to optimize the MTE extraction. As the problem was difficult to fix, it was decided to connect the BSW22 bumper with a spare unipolar power supply, such to maintain the possibility to serve the majority of the users (including SPS for the COLDEX MD on Wednesday (1st on November), AD, nTOF and LHC), but sacrificing the MTE beams. The BSW22 power supply was finally repaired on Wednesday (1st of November) afternoon, requiring a stop of approximate 2 h of all beams, and a total of approximate 30 h of downtime that explains the poor statistics of the week.

On the good news, on Tuesday (31st of October) PS reached the annual planned delivered intensity on the nTOF target. It was at 2.23E19 pot, or +2.7% higher than the year's goal of 2.17E19 pot. Studies on the 10 MHz C11 cavity performance that was equipped earlier with a first-of-series model of an amplifier, foreseen to be used in all cavities, revealed a problem, in particular for the high-intensity beams. A 2 h access would be needed this week to put back the pre-series model of the amplifier that was working fine earlier. It is an important test that would allow to timely identify possible issues with the new design of the amplifiers. The PS ran also a full MD program with several sessions ongoing (50 MD user cycles played for the last two weeks!), with all teams trying to collect data before the proton run ends for LS2.

It was agreed that on Wednesday morning (7th of November), once the LHC is filled, there will be an intervention (1.5 h + cool down time – see above).

B. Mikulec asked if ISOLDE would be affected.

I. Efthymiopoulos negated.

[Special report on the PS extraction bump power converter failure](#)

D. Aguglia reported on the incident of the PS extraction bump power converter ([Annex 7](#)).

In 2015 TE/EPC was asked by BE/ABP if there was a possibility to supply the BSW.14 in bipolar for MTE tests. The solutions consisted in using the BSW.22 spare converter to supply the BSW.14 magnet. However, in case of a serious failure, a roll-back to the previous scheme would be required, as no more bipolar spares were foreseen. Common failures would be treated with a standard repair procedure by EPC. As the MTE results were encouraging, BE/ABP asked TE/EPC if this new



powering solution could be maintained longer term (until LS2) and EPC agreed reminding the above conditions. The BE management was informed in June 2015 by BE/ABP. A BSW.22 PC failure happened on Tuesday (30th of October) at 13h00. The PIPO and OP responsible went on site for diagnostics and a short-circuited output thyristor bridge was suspected. At that moment, no engineering expert was available, and **D. Aguglia** was called. It was agreed to perform the roll-back. At 18h30 the intervention was finished and performance except for the MTE was restored. On Wednesday (31st of October) a re-analysis was performed on the BSW.22, revealing traces of water showers. This caused a short circuit and destroyed the polarity inverter thyristor's snubber. After replacement of a few components the power converter was retested on magnet and EPC rolled back to normal configuration; MTE was available at 16h20. The 365 building's roof status was the root cause of this failure and EPC had pointed out this issue to SMB in the last years. SMB will consolidate this building (roof included) in LS2. No bipolar spare was available for BSW.22, which was a known situation. EPC took some time to verify each component knowing that no spare was available. All BSW converters will be consolidated in LS2 with new models. After LS2 the spare situation will be back to the normal EPC spare policy.

East Area

B. Rae reported on the East Area.

Nothing special to report.

East Area Users

H. Wilkens reported on the users.

The CLOUD experiment was measuring the forest atmospheric conditions, which was followed by the simulation of the Amazon forest. After two weeks, it will move to study urban conditions.

nTOF

D. Macina reported on nTOF.

The users were happy. nTOF stops on Monday (12th of November).

AD-ELENA

B. Dupuy reported on AD and ELENA ([Annex 8](#)).

AD

The AD was running well this week, with good intensities.

Only one problem was reported. The bunch rotation cavity C10-26 was tripping several times during the week. The intensity reduced by 30% during this perturbation. The specialist had to work on site because the remote restart was at one point impossible. The problem was with the filament power-supply resistor (repair from 11h00 to 19h00 on Saturday (3rd of November)). The other perturbations were minor.



ELENA

The beam was shared between ELENA commissioning and the Gbar experiment, sometimes running in parallel. Many fruitless attempts to reduce the 50% losses occurring during the last ramp-down to 100 keV were tried: working point tuning throughout the cycle, tests of new working point on the opposite side of the diagonal, RF parameters, influence of vacuum gauge magnets in proximity of the circulating beam, cycle optimisation (round-offs, ramp lengths), studies on RF self-bunching and possible noise, etc. The optics model with kick response measurements was completed. The Gbar transfer line tested the SEM monitors and beam profiles were obtained at three different locations. Only one set of electronics was available, which was moved between the different monitors. Also, work on optics validation (kick response and Q scans) and the steering to Gbar was done. Some progress was made on the setting-up of the Gbar decelerator (together with the Gbar team). The LL RF FESA class was upgraded to accommodate for easier cycle programming and more features were added. The debugging was time consuming. The last week of ELENA beam commissioning for quite some time started.

AD/ELENA Users

H. Wilkens reported on the users.

Final measurements were taken for this year. AEGIS already stopped on Sunday (4th of November).

SPS

V. Kain reported on the status of the SPS ([Annex 9](#)).

The beginning of the week was still mainly dedicated to finishing off the last LHC MDs. The partially stripped ion beam foreseen for Tuesday (30th of October) could not be delivered due to the LINAC3 source solenoid break down. Ions were then only back in the SPS Sunday afternoon with very low intensity. The extraction with ions in Q26 was set up to the TT40/TT60 TED after the extraction and TCDI setting up with Q26 protons. The trajectory for beam 1 will need further adjustment to recover the required change of the extraction bump after aperture optimisation. On Tuesday (30th of October) at about 13h00 one of the extraction bumpers in the PS broke down and it could only be replaced with a unipolar one. As the MTE beam needs negative polarity and all the other beams positive, the NA did not receive any beam from Tuesday (30th of October) about 13h00 to Thursday (1st of November) evening after the MD. The PS bumper was repaired again Wednesday (31st of October) afternoon.

The 24 h COLDEX run foreseen for Wednesday (31st of October) 8h00 could only start properly at about 13h00 due to a problem with the BA4 lift and then insufficient beam quality for some time. Another two hours were then lost from 15h00 to 17h00 due to the final tests for the repaired extraction bumper in the PS. The COLDEX run was followed by an important slow extraction MD on Thursday, where several major breakthroughs for loss reduction and automation could be achieved. Octupole phase-space folding to reduce the density at the ZS wires was successfully tested and resulted in a 50% loss reduction. Later on during the day this was combined with the bent crystal shadowing the ZS in channelling mode which gave another 40% loss reduction. The factor 4



loss reduction required for the BDF/SHiP facility is hence almost within reach. In parallel noise injection on the main circuits was performed to characterise in more detail the transfer function to the beam and also the slow extracted intensity. And last but not least an automatic ZS alignment algorithm (9 degrees of freedom - all anode ends except the ZS1 upstream) was tested based on the Powell algorithm. The team achieved an alignment time of 40 minutes from scratch (all anodes at zero) compared to the typical setting up time so far of ~1 shift. From Thursday evening to Friday morning (1st/2nd of November) the crystal was left in beam aligned for volume reflection mode giving a 20% loss reduction in the LSS2 extraction region. The losses were stable throughout the night.

The North Area agreed to 2 h of no beam/reduced intensity on Friday (2nd of November) to finish the fixed target as well as some of the dedicated LHC reference measurements. All fixed target beam references are taken. The main outstanding reference measurements are the COAST ones. On Sunday evening (4th of November) ~1h30 were lost for LHC and NA, as the injection pre-pulses were not distributed from the Faraday cage.

R. Froeschl asked about the significant radiation values observed on Saturday (3rd of November) at around 17h00 at the TI2 line and TT61.

V. Kain answered that this was the setting up of the transfer line with Q26, and referring to a possible further mutual investigation.

V. Badin gave a summary of the COLDEX run. The start was delayed by a few hours because the COLDEX team got stuck in the BA4 elevator, followed by some minor problems. Afterwards the beam was of good quality and data could be collected. Beam induced heat load, electron cloud and impedance were measured in the past. Hence, it was possible to focus on other things, such as gas desorption from the beam screen and the propagation of the pressure wave. It will be relevant, since a new beam screen will be used after LS2 (carbon coated instead of copper). Analysis of the new data was ongoing.

North Area

B. Rae reported on the North Area.

No major issues occurred. In the afternoon (6th of November) interventions in the H3 beam line are planned (there was a high radiation issue). On Wednesday (7th of November), the DSO test for the new beam line will take place from 09h30 to 10h00. On Thursday (8th of November) from 09h30 to 10h00, there the DSO test for the ion run is foreseen. On Sunday (10th of November) there will be a test on the B42 beam line on a collimator.

North Area Users

H. Wilkens reported on the users.

The last data will be collected this week.

AWAKE

E. Gschwendtner reported on AWAKE.



A breakthrough was achieved on the weekend. A much larger capture rate was achieved, which increased the performance by a factor 50 (now at pico-Coulomb level). It would be very important to achieve a run of at least four hours in total.

CLEAR

There was no report.

TI

J. Nielsen reported on TI.

Monday evening (29th of October), around 20h15 there were two electrical perturbations separated by 5 minutes that caused quite some machine equipment to trip.

LHC

J. Wenninger reported on the LHC.

The Linac3 source problem delayed the set-up of the ion run. Usable beam was delivered since Monday (5th of November), but still has to be improved. Long fills were not possible before Thursday or Friday (8th/9th of November).

2. Schedule updates

B. Mikulec presented the injection schedule ([Annex 10](#)).

H. Bartosik mentioned that on Wednesday and Thursday (7th/8th of November), there were the last dedicated MD blocks of the year. In the morning (7th of November) there will be a coast beam in the SPS and as soon as the beam is stable, there will be an intervention in the PS, to exchange the power amplifier of the cavity. The PSB takes measurements on the recombination septa. This is followed by the turn by turn SEMgrid tests in the PS, which ends at 3pm. Then some studies for SHiP will be carried out. Not much beam is to be expected for the physics users.

J. Wenninger emphasised that this would delay the ion set up even further, which should be carefully considered. Mainly the set-up of the long cycle will be affected.

J. Wenninger agreed to discuss this further with **R. Steerenberg** and everybody involved in the afternoon (6th of November).

B. Mikulec continued with the schedule. On Monday (12th of November) 8h00, the proton run stops. There will be only a special MD in the PSB measuring the extraction kicker impedance. In parallel, there were activities for Linac2 dismantling planned at the same time (12th of November – start at 8h00). It was under discussion with EN-ACE and other people involved if these activities could be delayed to after 3pm. This will be followed up.

The radiation survey demands a beam stop of all machines 30h afterwards (14h00 Tuesday 13th of November). It will take around three hours.



R. Froeschl ensured that the Switchyard will be done first in order to allow LEIR to take beam earlier.

AOB

There was no AOB.

Minutes reported by [S. Hirlander](#) on 8th of November.



Summary of the 38th FOM Meeting

Held on Tuesday 13th November 2018

Agenda <https://indico.cern.ch/event/772804/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Schedule update*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 37th FOM](#) were approved.

2. Status of the machines.

Linac2, Linac3

D. Kuchler reported the status of the linacs ([Annex 1](#)).

The very last week of Linac2, after 40 years of operation, was almost perfect with only 10 minutes downtime on Thursday due to a power glitch. The machine was officially stopped yesterday and **D. Kuchler** acknowledged all the people involved in its operation.

The Linac3 source delivered pretty good intensity over the week, despite the very recent repair and the next oven refill is scheduled for next Monday. On Saturday, an issue with the tank3 RF stopped the beam production for 8 hours. The issue was pretty difficult to diagnose and involved the RF and EPC teams.

Linac4

B. Mikulec reported the status of Linac4 ([Annex 2](#)).

It was a good week for Linac4 with 95% availability. On Monday, the PIPO repaired a solenoid power converter and the RF team replaced a 20 kV source HV capacitor. A test of the source gas regulation loop was tested by ABP on Tuesday and the LLRF team exchanged the remaining cavity control loop old version modules. The rephasing of the linac cavities was started on Wednesday and fine tuning should be completed today.



LEIR

M. Angoletta presented the status of LEIR ([Annex 3](#)).

The LIU beam performances were recovered on Tuesday for EARLY and NOMINAL cycles with respectively $1.7E10$ and $9E10$ charges extracted. The electrical glitch on Thursday caused a Linac3 downtime of 1 hour. On Friday evening, some NOMINAL showed bad capture due to instability of the strong electron cooling. The issue with the Linac3 RF on Saturday interrupted the operation for 8 hours.

PSB

JF. Comblin reported on the PSB status ([Annex 4](#)).

It was a very good week for the PSB with 99.3% availability with only few resets and the power glitch that brought down the MPS. The MD schedule was very dense and extended over the week-end. All beams were stopped yesterday at 8.00 AM.

B. Mikulec acknowledged all the people involved in operation and the equipment groups who contributed to a very reliable run.

ISOLDE

J. Alberto Rodriguez reported the status of ISOLDE ([Annex 5](#)).

It was a very busy week at ISOLDE with beams delivered to 4 different experimental stations. GLM, GHM and LA1 took several Actinium isotopes from the GPS target from Wednesday. The HRS target was used in parallel to provide $33Ar$ and $32Ar$ to WISARD. Excluding a major issue with the HRS target just before the protons stopped, both HRS and GPS had excellent availability. ISOLDE will be kept running until the beginning of December with pre-irradiated targets.

ISOLDE Users

K. Johnston was not able to attend the meeting and sent the following report.

Last week there were four different setups taking either Ac beams from GPS or Ar from HRS. On GPS Ac beams were laser ionized for the first time and characterized in terms of production and release. In addition, precise measurements on the feeding of the isomer were carried out. The isomer of $229Th$ (fed through $229Ac$) has potential applications for a future nuclear clock and is currently the focus of intense research worldwide. Once the tuning problems of the GPS were overcome, the experiment managed to make a number of measurements using setups dedicated to beta-decay and emission channeling. In addition tests of $225Ac$ – useful for nuclear medicine – were carried out. Finally, $31Al$ collections were possible thanks to the flexibility of RILIS for studies of Si-V centers in diamond. Finally on HRS the newly commissioned WISARD setup took $32Ar$ and $33Ar$ into their setup. Beta-delayed protons were detected from $32Ar$ and initial data are promising even though this was primarily a preliminary run of this setup and the line failure meant that the HRS run ended a day early. A busy final week with protons, but a fairly successful one in spite of the difficulties tuning from GPS and the HRS line failure.



PS

D. Cotte reported the status of the PS ([Annex 6](#)).

A good week for the PS with 90% availability. A water leak in building 365, above the BSW22 power supply caused a downtime of almost 5 hours. Pending the roof repair, the power converter is now protected by a plastic jacket. On Wednesday, an access was given to the PS ring to replace the C11 amplifier (1.5 hours downtime). The MTE version of the Barrier bucket was sent to the SPS. For this very specific version, a Finemet cavity is used to create a gap without beam in order to compensate for the extraction kicker rising edge. It resulted in much less losses in the PS and still needs synchronisation with the SPS. First ion beams were sent to the East Area. For the 2018 run, the integrated intensity delivered to nToF was 6% above prediction.

An intervention was requested in order to replace the F61.BTV03 and it will take place in the shadow of the RP survey in the afternoon.

B. Mikulec commented that the roof repair of the building 365 was requested by **D. Aguglia** who had opened a ticket, but the process took quite some time.

V. Kain said that it is not clear yet if the SPS and the experiments could take the Barrier bucket MTE version. **H. Damerau** mentioned that there are still outstanding issue that are not so obvious to be solved for the synchronisation. Studies are on-going.

C. Rossi added that the newly installed C11 amplifier is equipped with the new feedback loop version that will be deployed after LS2.

East Area

B. Rae said it was a very good week. The renovation of T9 and T11 will now start. The beam permit for the East Area for ions was signed yesterday and the first Pb beams were sent to IRRAD and CHARM in the afternoon.

East Area Users

H. Wilkens said the users complained about the low number of spills due to the intense MD program. The CLOUD experiment will continue running without beam for the next 3 weeks.

nToF

D. Macina could not attend, but sent her acknowledgment to the operation teams for this excellent 2018 run.

AD - ELENA

L Ponce reported the status of AD ([Annex 7](#)).



The AD had a very good last week with more than 90% efficiency and 3.7 E7 Pbar extracted on average. The operation was only slightly perturbed by few issues with the E-cooler and the MD program in the PS.

Concerning ELENA, **T. Eriksson** said that the last week was pretty successful. The LLRF controls were upgraded and the deceleration on the last ramp reached 80% efficiency. The total efficiency only reached 50% of the predicted performances, which is also explained by losses between the AD and ELENA. The new extraction line will be installed in 2020.

AD users

H. Wilkens said it was a good week for the users.

SPS

V. Kain reported the status of the SPS ([Annex 8](#)).

It was not a great week for the SPS with only 80% availability. On Tuesday, the mains were lost due to a WIC interlock after loss of communication in BA2. This could temporarily be fixed, but it was followed by other issues with systems in BA2 originating from the same fault. Finally, the source of the problems could be traced down to a blown fuse of an 80V power supply. On Friday the beam to the North Area was cut due to a trip of the MBE2103 on a cooling fault. Fortunately, there was no fault on the actual device, but rather a wrong input signal that kept causing an interlock. Other faults came from the extraction bumper of the PS and on Saturday a bigger problem with a Linac3 RF amplifier. SFTPRO and AWAKE were perturbed by the LHC ions setting up. 3 cycles were prepared for LHCION: LHCION3 with EARLY beams, LHCION1 with NOMINAL beams with 12 injections and LHCION4 with NOMINAL beams with one injection for fast filling and tests. Details were given on the MD that took place. The fixed target beams were being sent with the first energy.

North Area

B. Rae said it was the last week for the M2, P42, K12 and H6 beam lines. The H2 extension beam line was successfully set up. First ion beams were sent yesterday to EHN1. H8 and H2 were tuned, H4 still needs adjustments.

North Area Users

H. Wilkens said that the LHC operation with ions had a very big impact on the number of spills sent to the NA that was reduced by a factor of 2.

AWAKE

E. Gschwendtner said they were done with the proton run. They will take partially stripped ions in 2 week's time.



CLEAR

There was no report.

LHC

M. Zerlauth reported the status of the LHC ([Annex 9](#)).

A good availability of 87% with 43% in stable beams. The setup of ion operation with 100 ns beams was completed on Friday and the intensity was ramped up during the weekend up to 480 bunches. The VdM scan took place on Sunday and a too large beam size was observed in IR2 (investigations are on-going). From Sunday, physics with 600 bunches is interleaved with VdM scans for ALICE, ATLAS and CMS. The switch to 75 ns is scheduled for tomorrow.

TI

C. Pruneaux said there was nothing special to report.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

The RP survey will take place today in the SPS at 14.00 and the Linac3 source oven refill is scheduled on Monday. D. Kuchler commented that the process for an oven refill takes up to 10 hours and he would like to have it starting as early as possible.

4. AOB.

There was no AOB.

Next Meeting: Tuesday 20th November 2018.

Minutes reported by [JB. Lallement](#) on 15th November.



Summary of the 39th FOM Meeting

Held on Tuesday 20th November 2018

Agenda <https://indico.cern.ch/event/774505/>

1. Follow up the last FOM
2. Schedule updates
3. AOB

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 38th FOM](#) were approved.

Linac3

F. Di Lorenzo reported on Linac3 ([Annex 1](#)).

On Tuesday (13th of November) in the morning around 4h00 the source produced less intensity. After several setups the source has been stabilized again around 14h00. On Friday (16th of November) around 11h00 in the morning, the stripper foil was changed. On Sunday (18th of November) around 13h00 the source started to be unstable again. **F. Di Lorenzo** and **D. Kuechler** worked to recover the stability, but no substantial improvements were achieved. The source has been running very well for all week (w46) with a very good intensity. The source was stopped on Monday (19th of November) morning for an oven refill. On Tuesday (20th of November) the IGBT of the amplifier of tank2 and tank3 broke and had to be replaced by spares.

R. Alemany added that there were three spares of these amplifiers, and usually it is possible to repair these. It was crucial because the same element broke in tank3 two weeks ago (w44).

B. Mikulec said that there should be a more detailed report on this topic next week.

Linac4

B. Mikulec reported on Linac4 ([Annex 2](#)).

Linac4 had a below average performance with an availability of 84%. Tuesday (13th of November) the source was again caesiated and a controls loop card exchanged on PIMS11/12 to test the Kalman filter. It was found that a cavity resonance was excited, and therefore the RF team will work on a notch filter. It is important that the Kalman filter will be tested on each cavity type before the end of the run. Re-phasing of the linac was finished Tuesday (13th of November) evening.



During the week several faults happened.

On Wednesday (14th of November) the source showed issues, and the RF team replaced the RF tube. Unfortunately, this didn't help and an access was required - it was found that a soldered connector piece holding the inductor between the capacitor and the antenna had broken. It touched the ground leading to a short circuit; the team could quickly repair the inductor. In the evening CCDTL5/6 tripped and could only be reset by the specialist.

On Thursday (15th of November) almost 6 h were lost when trying to set up the beam to the temporary dump, as the horizontal bending magnet did not take the 'PSB' destination anymore; the EPC specialist had to roll back the last software change. On Friday (16th of November) a few issues with the BCTs in the transfer line hampered the steering setup - solved in the evening.

Finally, Friday (16th of November) evening steering to the temporary dump could be done using YASP. Ready to finally program a simulation of a future PSB commissioning supercycle with different cycle setups.

LEIR

A. Saa Hernandez reported on LEIR ([Annex 3](#)).

In general, the week was quite fine with LEIR extracting an average of $9e10$ ions from the NOMINAL cycle (with peaks over $10e10$) towards LHC and $1.5e10$ ions from the EARLY cycle towards the fixed target experiments. The availability has been 85.8%, with a short fault (1.30h) due to a convertor of quadrupole ITE.QFN03, which had to be exchanged, and longer faults due to large intensity fluctuations from the source. LEIR had to be reoptimized for a lower intensity from Linac3 on Sunday (18th of November) evening. During this week (w46) the White-Rabbit B-Train was also tested on operational cycles. It proved to be transparent to the beam, so it is now used by default, also during LHC fillings. A 3-bunch 75 ns cycle was optimized with maximum extracted intensities of $9.6e10$ charges. This cycle was sent up to the SPS. An observation of the BCTs along the injection line revealed that although the intensity displayed at Linac3 was sufficient, the delivered charge states were not consisting only the needed ones. A change of the stripper foil solved the issue.

B. Mikulec asked about the origin of an energy drift of the beam observed with the Schottky system delivered by Linac3.

A. Saa Hernandez replied that the drift was clearly visible with the Schottky system but the origin was not yet fully understood.

ISOLDE

E. Fadakis reported on ISOLDE ([Annex 5](#)).

The production with the primary beam was stopped on Monday (12th November).

From Thursday (15th of November) afternoon 7Be was delivered to XT03 at an energy of 5 MeV/u. The target for this experiment was pre-irradiated at ISOLDE some weeks ago and currently it was being used to slowly extract the 7Be (half-life of 53 days). No major issues were reported apart from some RILIS adjustments during the run. ISOLDE will run at least for one more week.



ISOLDE Users

K. Johnston reported for the ISOLDE Users and sent an email:

It has been a very smooth week for the users at ISOLDE: 7Be was taken at 5MeV/u to the third beamline of HIE ISOLDE. The aim is to study the excited states of 8Be using single neutron transfer reactions for nuclear astrophysics. The 7Be was delivered from a previously irradiated target which has been carefully heated up. There is always a risk with such “winter physics” experiments that the desired isotope is not sufficiently delivered but this experiment has proceeded very smoothly: the users will run till tomorrow morning and will achieve sufficient statistics for their experiment.

PS

A. Guerrero reported on the status of the PS ([Annex 6](#)).

The availability of the PS was above 90%. The first ion week in the PS started with POPS trips on Tuesday (13th of November) causing a beam downtime of 1h30 in the morning and 9h00 during the night and Wednesday (14th of November) morning. The PIPO was called during the night and the specialist joined early in the morning. There were several problems concerning the communication among some subsystems and the FGC. Several interlock cards were exchanged as well as a crate due to an auxiliary power supply failure. The beam was back on Wednesday at 14h00. On Tuesday (15th of November) at 13h30 the beam was stopped to carry out the end of proton RP survey. The Switchyard was back in beam mode by 16h00 and 40 minutes later the PS followed. During the stop a camera was exchanged in the F61 line and the long-standing frequent trip problem of the PFW was solved. The PR.PFN/I circuits could take the former slope on the ion cycles with the power converter following well the reference. It was also tested on LHC cycles without issues. The PS has produced and sent two type of nominal beams to the SPS and LHC (ILHC100ns 4b & ILHC75ns 3b) and the 1b EARLY beam. To EAST area, a 1b EARLY beam and a nominal 2b beam with almost 8 times the intensity of the EARLY beam have been sent. On Tuesday (13th of November) evening a calibration with the F61.FBCT (fast extraction) was done.

B. Mikulec asked what the solution for the problem with the pole face windings consisted of.

A. Guerrero answered that there was a problem with the settings. The loaded settings were not correct and had to be fine-tuned.

B. Mikulec asked why the same settings work now and did not work for a long time.

X. Genillon answered that he would follow up this question with his group.

East Area

B. Rae reported on the East Area.

Nothing special to report.



East Area Users

H. Wilkens reported on the users.

Nothing special to report.

SPS

R. Alemany reported on the status of the SPS ([Annex 9](#)).

At the beginning of the week there was the end of proton physics and the start the of the NA ion beam setting up. The beam was handed over to the NA on Monday (12th of November) evening without issues. On Tuesday (13th of November) instabilities of the ion source impacted the efficiency of the setting up of the NA beam, around 1 out of 6 cycles could be used for setting up, which made the setting up operation very lengthy. On top of this PS POPS trips led to 1h30 of downtime. On Wednesday (14th of November) significant losses on the LHCION1 at the start of the ramp and on the flat top appeared during the night. By reducing the QV, the transmission got better, and LHC could get the beam. However, later ADT tuning helped to cure the instabilities. The NA beam got affected by a forced door in H8; a time of 0h15 without beam was the consequence. On the injector side, two main faults affected the SPS operation: 1h30 hours were lost because of the trip of a LEIR transfer line power converter that required the change of the power converter and the PS POPS trip gave a downtime of 9 h. On Thursday (15th of November) the SPS compensator tripped and was down for 3h40. In the afternoon, problems with the power converters of BA4 gave a downtime of almost 4 h. The first line put the spare power converter in service to fix the problem with the MPSH4140 (that caused a daisy chain problem). When the daisy chain was back, a problem on an acquisition card on MUGEF appeared. On Friday (16th of November) some RF low-level functions had to be updated, and as a consequence, the ADT had to be re-setup. The only beam affected was the LHC beam, but the setup required the LHC cycle to be in the supercycle, which affected the duty cycle of the NA physics. On Sunday (18th of November) source problems needed an intervention of the Linac3 supervisor. Once the source could be stabilized, the LEIR supervisor came to re-optimize LEIR for lower intensities from source. At around 22h30 LHC could be filled with less intensity, but rather stable conditions. The 12 injections of 3 bunches of 75 ns beam has been set up in SPS, but not yet sent to LHC. Otherwise, SPS has been smoothly delivering beam to NA and LHC.

B. Rae asked about the BTV in front of TT2.

K. Cornelis replied that there was an access on Monday (19th of November) and it was confirmed that the camera is broken and on Wednesday (21st of November) it will be fixed. The instrument is very important since the beam is very big and there is no other way to monitor the steering at that location. It is not needed for protons.

B. Mikulec mentioned that there were several spare power convertors not working as they should when they were put into operation. She asked how they were tested.



X. Genillon answered that the spare power converters were routinely tested during the shutdown by connecting them, but as not all the configuration was equal, they could not be considered as hot spares.

B. Mikulec added that the software compatibility should also be checked and suggested that this topic should be discussed within the EPC group.

North Area

B. Rae reported on the North Area.

The tuning on H4 had been finished. On H8 at the 4th door, there was a problem, which needed a change of the access system. Luckily that happened in the shadow of the LHC filling.

North Area Users

H. Wilkens reported on the users.

The start of the NA61 experiment was quite challenging. On the experimental side, there was the observation of up to 1000 tracks. The physics was started on Saturday (17th of November). The users were happy with the stability and the small beam size at the target.

CLEAR

There was no report.

TI

G. Langlois reported on TI.

Nothing special to report.

LHC

R. Steerenberg reported on the LHC.

The ion run was not straight-forward so far. The beam size for ALICE was larger than expected and some studies were done. Cogging was done to determine if the waist was where it should be, which was finally confirmed. For the moment, it seems that the local coupling was the cause of the large beam size. This problem was treated with skew quadrupoles. Another topic was the change of polarity of ALICE, which should not have an impact on the operation. There was also the request of the 75ns beam, but the exact time was not yet fixed, due to the problems with the beam size.

2. Schedule updates

B. Mikulec presented the injector schedule ([Annex 10](#)).



R. Steerenberg said that the MD today (20th of November) was divided into two blocks, for which the scheduling was still under discussion, to be decided at the LMC meeting. One of the MDs will quench the magnets, which will be moved to the end.

H. Bartosik said that there will be an optimization on an LHC beam for 10 h on Wednesday, consequently there will be no beam for the NA from 8h00 to 18h00.

A change of the schedule of next week was announced. The 24h MD foreseen for the 28th was shifted to the 26th of November.

AOB

B. Mikulec mentioned that for the FOM on the 11th of December a small Christmas event is foreseen and a special presentation by **R. Steerenberg**.

Minutes reported by [S. Hirlander](#) on 22th of November.



Summary of the 40th FOM Meeting

Held on Tuesday 27th November 2018

Agenda <https://indico.cern.ch/event/776427/>

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Schedule update*
- 4. AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 39th FOM](#) were approved.

2. Status of the machines.

Linac3

JB. Lallement reported the status of the linacs ([Annex 1](#)).

The source ovens were refilled with new lead on Monday morning and beam was available to LEIR early afternoon. The tank3 went down during the night from Monday to Tuesday. The RF expert came in and fixed several issues on tank2 and tank3 (IGBTs on tank 2 & 3 and cathode switch control box on tank3). Because of a glitch in the meantime, the PLC controlling the tank3 tuners had to be reset (beam back on Tuesday morning - total ~ 7 hours downtime). The week went pretty smoothly with usual and frequent source tuning, until Saturday evening when the beam current out of the source became slightly unstable. The stability of the source degraded suddenly on Sunday at 13.00. It took a few hours and the intervention of the source expert to recover a stable situation. Unfortunately, the RFQ went down in the meantime (at 17.00). The RF expert had to come in and, after investigations, found a faulty ignitron power supply that was replaced. Beam was back to LEIR at 23.20 (~ 6 hours downtime). After further ion source adjustments, stable operation was recovered.

Linac4

B. Mikulec reported the status of Linac4 ([Annex 2](#)).

The linac had a pretty good week with 98% availability. After several issues during the previous week, the beam quality evaluation could start on Monday, following the linac re-phasing after the exchange of the cavity loop controls cards. There were issues with transmission around the bending magnet,



large position/intensity/phase fluctuations and wide beam profiles. Therefore on Tuesday longitudinal measurements were performed with the bunch shape measurement system that showed that the beam was exiting the linac pretty debunched. After several checks on Wednesday it was decided to re-phase all cavities once more, which was started on Thursday and finished Friday evening. Beam measurements Friday evening after re-steering showed excellent results, and finally a long 'commissioning' supercycle could be set up with cycles imitating the first post-LS2 PSB commissioning cycles, sent both to the Linac4 dump and to the temporary dump. Unfortunately beam operation had to stop in the night from Saturday to Sunday due to a fault on the CCDTL3/4 modulator, which was solved on Monday morning. Some problems with the chopping efficiency will be investigated.

LEIR.

R. Alemany presented the status of LEIR ([Annex 3](#)).

Overall a good week for LEIR. On Tuesday the MDRF cycle was finely tuned to reach the record intensity of $10e10$ charges extracted. The beam was since then used on request of LHC with no particular issues. The extraction to PS was further optimised to reach 100% transmission efficiency. On Wednesday tests with lower intensity from the SPS were performed using the Linac3 slits: parallel MDs (space charge and electron cooling) took place. During the night from Friday to Saturday, EPC was called for a non-resettable HT sum fault on CRF41, which was promptly fixed. On Saturday afternoon, a lower intensity was delivered by Linac3, which implied a small retuning of LEIR. Nevertheless, the source was back to standard operation ($>30uA$) for the LHC filling period. On Sunday afternoon, the source showed unstable behaviour and had to be re-tuned by the Linac3 experts in the shadow of the LHC stable beams. Unfortunately, efforts did not pay off, as a parallel problem on the Linac3 RFQ took place as already mentioned.

ISOLDE

S. Mataguez reported the status of ISOLDE ([Annex 4](#)).

It was a very good week at ISOLDE. 7Be were delivered to XT03 (IS554) from GPS until Wednesday. The central beam line was then switched and delivered 138Ba 19F / 226Ra 19F for CRIS at 40kV from target #637 UC+CF4 on HRS, which was pre-irradiated at ISOLDE some weeks ago.

A. Rodriguez added that the ISOLDE operation will need the controls available until December 17th.

ISOLDE Users

K. Johnston was not able to attend the meeting and sent the following report.

Last week was the second experiment of the winter physics program. The CRIS experiment were measuring the spectroscopic properties of RaF molecules which were released from a previously irradiated target. The study of RaF has been suggested to be particularly important to parity violation effects and electric-dipole moment searches. This is a very challenging experiment but has been unusually assisted by accurate predictions from theory. Initial scans revealed the desired resonance and the experiment has been continuing to optimize the setup over the weekend. Excellent data are being obtained and it has been a very smooth run.



PS

F. Tecker reported the status of the PS ([Annex 5](#)).

The PS had a good week, with beam availability of about 88% and most of the downtime coming from the injectors. There was a trip of the Switchyard due to the access system manipulations for the new PSB POPS-B, which caused 1:15 downtime, and a trip of septum SMH57, causing 0:40 downtime. Since Tuesday, the 10 MHz cavity C76 was down. It was checked that the ion beams can be produced with even only nine cavities, meaning that the trip of another cavity can be compensated without implications. The issue was nevertheless fixed yesterday.

East Area

B. Rae said it was a very good week.

East Area Users

H. Wilkens said the users were happy.

SPS

H. Bartosik reported the status of the SPS ([Annex 6](#)).

It was a good week for the SPS. After the oven refill on Monday the beam came back in the afternoon with very good intensity and stability for most of the week. The North Area fixed target beam could thus be delivered with very good reproducibility. However, due to longer stops caused by issues in LEIR (extraction kicker) and Linac3 (RF) on Monday night and Sunday afternoon/night the overall beam availability was only 81%. On Tuesday the long LHC filling cycle with 12 injections was prepared for the injections of 3 bunches spaced by 75 ns from the PS and sent to the LHC for the first time. A significant increase in intensity was achieved compared to the previously used 4 bunches space scheme. During the dedicated MD on Wednesday an even longer cycle with 14 injections was prepared on the request of the LHC, which allows reaching 733 bunches in the LHC and record peak luminosities for Pb-Pb collisions. Some intermittent issues with the synchronization between SPS and LHC were encountered on Saturday. The preparation of the cycle for partially stripped ions to be sent to AWAKE for calibration purposes is well advanced. However, during an attempt of extracting the beam to the TT40 TED, it was found that the dynamic destination from LEIR to AWAKE was missing. This requires an update of the timing system before AWAKE can take the beam.

M. Gourber commented that the restart of the central timing front-end will require 15 minutes and impact all the injectors. It is scheduled for tomorrow. The CO team will also restart all the LEIR front-ends (30 minutes to finish). **V. Kain** will coordinate this intervention with CO.



North Area

B. Rae said it was a very good week.

North Area Users

H. Wilkens said that NA61 received a very good quality beam. Unfortunately, during the flushing of the COMPASS argon line on Monday, a valve was left open and hydrogen flowed back and contaminated the line. COMPASS was back on Wednesday evening. The issue will be discussed at the TIOC.

AWAKE

E. Gschwendtner said they were now ready to receive the partially stripped ions.

CLEAR

There was no report.

LHC

D. Nisbet reported the status of the LHC.

It was a very good week for the LHC. The beam size issues encountered in ALICE were understood and corrected.

TI

R. Ledru said there was nothing special to report.

3. Schedule update.

B. Mikulec presented the [injector schedule](#) (version 1.6).

D. K uchler said that the oven power had to be increased by quite a lot on Sunday to recover source stability. Even if the source could run, in principle, until next Monday, there is a high risk that the source becomes unstable during the weekend that would mean, in the worst case scenario, a pretty long Linac3 beam unavailability. He then proposed to schedule the next (and the last) oven refill on Thursday.

After discussion, it was decided to endorse this proposal.

H. Wilkens added that given this last-minute schedule change, a re-scheduling of the beam energy change should be envisaged.



H. Bartosik said that there were still a few parallel MDs ongoing.

4. AOB.

Follow-up of the recent Linac3 RF failures

S. Ramberger presented details on the recent Linac3 RF failures ([Annex 7](#)).

Two similar failures occurred on November 10th and 20th on the 200 MHz systems. In both cases, the causes of the issues were the failure of IGBTs and trigger units. IGBTs are very sensitive to over-voltage and over-current and have also a limited lifetime. The two interventions were pretty lengthy because they required the intervention of EPC for working on HV equipment with all the procedures that it implies (ramp down/up, lock-out, grounding...). EPC was asked to consolidate the PC with two separated units. There are still 6 IGBTs spares available and 20 others were ordered. There are 2 replacement trigger boxes and 2 are under repair. There is also one full spare identical amplifier and 2 slightly different ones.

The issue that occurred on November 25th concerned the 100 MHz RFQ system. It was due to a faulty ignitron unit and the failure of a pre-magnetizer PSU. The diagnostic was pretty difficult as the PLC did not monitor the fault. These issues are most probably related to aging.

In the framework of the consolidation project, it is planned to replace the 2.5 kW amplifiers for buncher, debuncher and ramping cavities, replace one 350 kW Bertronix amplifiers for RFQ and the first IH and have maintenance of IH 2 and 3 amplifiers (EPC will replace the PCs only post LS2). For the time being, only one 350 kW replacement is financed.

C. Rossi added that the situation is well known by the management and has been presented at the IEFC. Discussions on priorities are ongoing between the RF group and the consolidation project management.

IT-DB intervention on December 10th

M. Gourber announced that an IT-DB intervention will take place on December 10th at 7.45 AM for about 1 hour, with impact on the few clients if any running beyond Dec 10th.

<https://impact.cern.ch/impact/secure/?place=editActivity:121681>

The latest set of security and stability Linux patches on the Accelerator related databases needs to be deployed. This activity implies a restart of the database server nodes. The DB servers affected are: Controls/LSA & LASER, LHC Measurements, LHC Logging.

It will be reminded during the next meeting.

Next Meeting: Tuesday 4th December 2018.

Minutes reported by [JB. Lallement](#) on 29th November.



Summary of the 41th FOM Meeting

Held on Tuesday 4th December 2018

Agenda <https://indico.cern.ch/event/777944/>

1. Follow up the last FOM
2. Schedule updates
3. AOB

1. Follow up the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 40th FOM](#) were approved.

TI

R. Ledru reported for TI.

Due to a thunderstorm and lightning, the 400kV was lost Monday (3rd of December) around 19h40. CERN was supplied (only for safety) from SIG and the 20kV from pays de Gex during a few hours. EN-EL in coordination with RTE restored the normal supply (400kV).

For the moment there was only the 400kV/66kV transformer (currently CERN is limited in power) available.

Linac3

D. Kuechler reported for the Linac3 and sent an email:

We had a very good week this week. On Thursday, the ovens were refilled. Downtime 8.5 hours.

This morning there were some small intensity issues which were first thought to be the source, but in the end, it was a stripper issue.

Otherwise the whole week intensities 30-33 μ A.

Linac4

B. Mikulec reported on Linac4 ([Annex 1](#)).

It was a very busy week for Linac4 with a good availability of 98.3%. Most of the week (w48) was dedicated to RF MDs to obtain all the necessary data to prepare LS2, and some time was also spent to further commission the laser emittance meter. The Kalman filter was tested for each cavity type as well as power margins for certain klystrons. Reference measurements were done every shift and



issues with ppm and multi-destination operation were being followed up. It was a dense program for the last week of operation this year.

Due to the power cut most references of the FGCs were lost, which demanded further investigations.

LEIR

S. Hirlander reported on LEIR ([Annex 2](#)).

LEIR had an eventful and good week. The by LHC demanded intensity was reliably delivered till the end of the physics run.

The principal issue of the week was the complete performance loss on Wednesday (28th of November) after a reboot of the timing system. The new Btrain system lost the reference for the B-field due to the reboot. Without knowing the root of the problems, it was possible by applying a strong energy correction in tank 2 and 3 (Linac3) and adjusting the electron cooler gun voltage, to get sufficient intensity to run the automatized Powell alignment and to recover within less than one hour the target intensity and send the beam to LHC. After the oven refill on Thursday (29th of November) the system was set to the old B-train system, and it was tried to restore the performance with the previous settings (before the reboot) without success. LEIR was again, mostly automatically - using Powell, optimized and runs currently using the old B-train. No significant performance drops were observed till the end of the physics run, and Powell restored the target performance automatically if needed over the weekend. In the night from Sunday to Monday (2nd-3rd of December) the performance of the source of Linac3 was decreasing, which was shadowed by problems in the PS (PFW), and only seen very late, which did not allow to make the final quench test in LHC in the morning. After changing the foil, the performance of LEIR was immediately recovered by small optimizations. The power cut Monday evening (3rd of December) was stopping several systems and it was foreseen to get beam back at around 14h00 on Tuesday (4th of December). On the HW side, there were inspections with BPMs in the transfer line and in EI, to test the upgrade to the new HF system. During the source refill, there was an access to re-cable the former tune kicker (ER.KQF12) as a pickup and connected the signals to the control room in order to test whether it could be used for a bunch-by-bunch intensity measurement. On the MD side, cooling studies were performed to investigate the impact of different transverse electron-beam-shapes of the e-cooler. A not entirely successful trial to set up the fast ramp eight injection cycle was made. Complete compensation of the stray fields of PS was successfully demonstrated. Finally, an automatic injection energy distribution correction was tested.

ISOLDE

A. Rodriguez reported on ISOLDE ([Annex 3](#)).

It has been a very good and calm week at ISOLDE. It was the last week of physics at ISOLDE. ISOLDE was delivering several molecular radioactive beams (²²xRa19F) from a pre-irradiated target installed in the HRS frontend to the CRIS experimental station during most of the week (w48). Several MDs were done in parallel: the development of ionization scheme for Titanium



beams (target and laser teams), transmission and efficiency measurements of REX-TRAP and REX-EBIS for Titanium (OP) and beam emittance measurements in the REX/HIE-ISOLDE linac (OP). No fault was reported till the power cut on Monday (3rd of December) evening. Liquid Helium was lost in the SC cavities, which caused the temperature to climb above the critical temperature. Also, all vacuum systems were lost. The recovering process was ongoing.

ISOLDE Users

K. Johnston reported for the ISOLDE Users and sent an email:

Until last night it was a very smooth week at ISOLDE: CRIS continued measuring RaF molecules with increasing precision. 223RaF, 226RaF and 225RaF have been measured, all in high resolution. This has been a very successful run with a lot of new data on previously unmeasured systems. With the power cuts, last night, the run ended, but the users and the collaboration are very satisfied with how this winter physics run proceeded. This was the last physics run at ISOLDE for 2018. We will be back after LS2.

PS

K. Hanke reported on the status of the PS ([Annex 4](#)).

It was a reasonably good week for the PS.

On Monday (26th of November) there was a 2h00 downtime due to the SMH57 power supply, first the ABT experts were called in and then the EPC piquet who managed to re-start the power supply. On Wednesday (28th of November) there was a planned intervention on the timings, after which LEIR was in a perturbed state for about 2h30. Also on Wednesday (28th of November) there were some issues with KFA71, which kept on tripping; the piquet did a reboot. On Thursday (29th of November) there was the planned Linac3 source re-fill starting at about 6h00 and lasting until 15h00. Advantage of the stop was taken and an access for RF for an intervention on the C80 fast tuner was given. In the evening the KFA71 started tripping again, the piquet came in, but could not solve the issue, so the OP team kept on resetting during the night. The next day (30th of November) **J. Schipper** managed to solve the problem permanently. The weekend was very quiet until Sunday (2nd of December) evening when the PFW tripped. The EPC piquet and some other experts intervened and changed the power supply for a spare (filter had burnt). The total downtime was 4h26. On Monday (3rd of December) morning CV shut down the cooling plant of the East Area, which also supplies the PFW, in order to start LS2 work. This took out the PS, which is still supposed to run for one more week. CV put in place a workaround, to supply the PFW from the centre-anneau station. **S. Deleval** explained that this problem happened due to a configuration that was put in place temporarily at machine start-up, and was then forgotten to be restored to the nominal operational condition.

A possible combined schedule for the injectors and the LHC was proposed for post-LS2.

East Area

B. Rae reported on the East Area.



Nothing special to report.

East Area Users

H. Wilkens reported on the users.

The users were happy.

SPS

V. Kain reported on the status of the SPS ([Annex 5](#)).

The SPS week 48 was a successful final week for the LHC ions and the 380Z GeV run for NA. The availability was 94 % with the main faults coming from the injector complex (PS and LINAC3) during Sunday night (2nd of December) and also about 1h00 of downtime due to instabilities of the BPM front-ends in the SPS. A successful UA9 run in COAST took place on Monday (26th of November) for 24 h with 4 NOMINAL injections. The 100 ns, 4 bunch, as well as the EARLY beam single injection for various LHC MDs and vdM scans, which took place on Tuesday, Thursday and Sunday (27th, 29th November and 2nd of December), were re-checked. The 75 ns beam was tried out with the new transition crossing hardware in the PS and on Friday (30th of November) a 6 bunch, 100 ns spacing, version of the NOMINAL beam was checked in the SPS to prepare for a possible first beam with slip stacking post-LS2. Everything was successful. As another test for post-LS2 operation the SPS RF system was switched to the new B-train for a short test period. No difference could be measured. The oven re-fill took 8h55 minutes on Thursday (29th of November).

Friday night (30th of November) AWAKE took the PSI 81+ beam (2 bunches) for the spectrometer calibration. The AWAKE team was very happy with the beam and the reproducibility. The setting up of this beam was more difficult than expected due to various controls obstacles (AWAKE destination not possible in LEIR, extraction pre-pulse coming out too late due to settings management issue). Almost all week (w48) last crystal studies were carried out on the SFTION cycle. The quality of the BLM reading in LSS2 was sufficiently good with high gain despite the low intensity extracted. For the crystal studies the slow extraction was switched to COSE on Friday (30th of November) without any issues. COSE was kept over the weekend.

Due to the almost 6h00 lost in the night from Sunday to Monday (2nd-3rd of December) the switch to the lower energy (14.5A GeV/c) for NA will only start at 10h00 on Monday (3rd of December).

North Area

B. Rae reported on the North Area.

It was a very good week. On Monday (3rd of December) for the first time beam at low energy was seen.

North Area Users

H. Wilkens reported on the users.



The NA61 run went fine until Sunday (2nd of December) evening. The program was changed, because the calibration of modules for the MODUL experiment failed due to missing intensity from Linac3. Fragmentation studies were now foreseen for NA61. The power cut impacted the gas system and re-establishing the conditions was ongoing. In addition, the cryo was affected and a lot of Helium was released, hence magnet checks were planned.

The question was asked if there would be the possibility to extend the run time on Monday (10th of December).

B. Mikulec answered that certain LS2 activities were planned to start immediately after the beam stop. In case of a serious request, all machine coordinators would have to be consulted to evaluate the impact.

The beam stop time was maintained at 6am on Monday.

CLEAR

There was no report.

AWAKE

There was no report.

TI

J. Nielsen shortly announced that the PS, LEIR and Linac3 were back after the electrical outing.

LHC

J. Wenninger reported on the LHC.

The physics run finished well. The source refill was fast. The last MD, a quench test, suffered from a problem of PS followed by a Linac3 problem. Finally, it was not possible to fill the LHC. The quench campaign performed a training quench instead of a beam quench. Shortly before the second test was finished, the power cut hit the LHC very hard. The power was lost and the cryo went down. The cooling ventilation was lost. A lot of Helium was lost in the tunnel and the crisis team had to be activated. At 2h00 (4th of December) the situation was under control. The reshuffling of the Helium to prevent the inventory to lose more Helium was ongoing. Normal conditions were expected in 48h00 (from Tuesday 4th of December 11h00). After verifying that all cables are fine, the quench campaign will be finished (one more quench).

2. Schedule updates

B. Mikulec presented the injector schedule ([Annex 10](#)).



The last week was presented. The beam stops on Monday (10th of December) at 6h00.

AOB

Next week there will be a small Christmas celebration.
There is no FOM during LS2.

Minutes reported by [S. Hirlander](#) on 6th of December.



Summary of the 42nd FOM Meeting

Held on Tuesday 11th December 2018

Agenda <https://indico.cern.ch/event/779798/>

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *End-of-run presentation*
4. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in [Annex 0](#).

The [minutes of the 41st FOM](#) were approved.

2. Status of the machines.

Linac3

D. KÜchler reported for **R. Scrivens** the status of the linacs ([Annex 1](#)).

Following the power cut on Monday evening, the beam was back to LEIR 4 hours after the green light was given on Tuesday morning. On Friday, one of the source power converters tripped twice and could not easily be restarted. It required adjustment of the filter parameters. Each trip required an hour-long reconditioning of the source. On Saturday a source performance change started around 12.00, and it took until around 21:00 to get back to a stable situation.

Linac4

B. Mikulec reported the status of Linac4 ([Annex 2](#)).

The planned program could be completed and the required data to prepare for the LBE line run next year were taken. Last week was marked by the thunderstorm on Monday evening bringing down a lot of equipment. Beam was only back on Tuesday around 17.30, which is understandable also because there is no piquet coverage during nights and due to the lower priority for the restart compared to the other machines. An access was required in addition due to flowmeter problems with DTL3 and PIMS11/12. During the restart, there were different problems related to FGCs that were analysed by EPC. The summary of the weekly availability during the reliability run was given with an average of 94.8% over 10 weeks.



LEIR

A. Saa Hernandez presented the status of LEIR ([Annex 3](#)).

It was a pretty good week for LEIR with 88% availability. Beam was extracted towards the fixed target experiments quasi-continuously from Tuesday noon on, once recovered from the Monday evening power cut. After the glitch a tune ripple of 50 Hz and ~ 1 Gauss peak-to-peak amplitude was measured on the main bends. The tune ripple was present independently from the B-train used (WhiteRabbit or the previous system) and the piquet was called to perform further investigations. The tune ripple was still observed for a DC-field on the main bends, and also after a change of the regulator card. It "spontaneously" cured on Tuesday evening and despite the efforts to track down its source it could not be explained. On the MD side, the tests with the turn-by-turn BPM system continued and the tune could be reconstructed during ramping and at flat top with clean measurements. Investigation took place to understand if the position of the electron beam in the electron cooler could also be measured with the use of the ion BPMs. Quite some time was devoted to get reference measurements of pretty much everything and on all cycles for a smooth recovery after LS2.

PS

D. Cotte reported the status of the PS ([Annex 4](#)).

Following the power cut, the PS was restarted on Tuesday morning after the patrol of the TT2 Sector_1. There were only few short beam interruptions during the rest of the week. A new RF card prototype generating the master clock (256) was tested. A new simulated Btrain transmission via WhiteRabbit was tested yesterday.

F-X. Nuiry commented that, although the system will be replaced during LS2, STI will investigate the issue observed with the internal dump during the restart on Tuesday morning.

M. Gourber asked whether the Btrain test went well. **H. Damerou** answered that there was still some work left on the software side, but that the test was pretty successful.

East Area

B. Rae said there was nothing to report.

East Area Users

H. Wilkens said the experiments were stopped last week. Users are now eager to test post-LS2 beams.

SPS

F. Velotti reported the status of the SPS ([Annex 5](#)).

It was a pretty good week with 85% availability and NA users taking 36.8 ZGeV/c lead beam. The Monday evening event caused around 16h of no beam for the SPS. The recovery was slowed down by the power limitation imposed and the green light to restart was given on Tuesday morning. After the restart of Linac3, LEIR and of the PS, beam could be sent to the NA around 13.00 on Tuesday. This issue also caused the need for 2 accesses for the crab cavities (on Tuesday and Wednesday). The SPS



and its injectors worked pretty stably until Saturday when the Linac3 source became unstable and needed the expert to work on it for almost the whole day.

North Area

B. Rae said it was a very good week. Following the power cut, the beam was back to NA61 on Tuesday evening.

North Area Users

H. Wilkens said that 2 NA61 vertex magnets tripped during the power cut. They were back on Wednesday and Thursday evening. Users were pretty happy in the end. A Russian satellite experiment took place successfully in H8.

AWAKE

E. Gschwendtner said they had laser tests last week and electron beam experiments are scheduled for this week. Unfortunately, this coming week program is perturbed by SPS magnet tests.

V. Kain commented that the priority will be given to magnet tests. Scheduling will be discussed offline between SPS and AWAKE teams.

CLEAR

A. Curcio reported the status of CLEAR ([Annex 6](#)).

A resistor was replaced on the modulator of the RF-deflector's klystron. A new BPM design based on incoherent Cherenkov diffraction radiation in the visible/NIR region was tested. CLEAR also suffered from the Monday evening event. An irradiation experiment with users from the CHU of Lausanne will take place this week. The machine will be stopped next week until mid-February.

TI

C. Pruneaux said there was nothing to report apart from the power cut on Monday evening.

3. End-of-run presentation.

R. Steerenberg presented a summary of the 2018 injectors' run ([Annex 7](#)).

He thanked all the people and teams involved in the FOM and emphasised the importance of the FOM and input from all the participants for the operational performance of the accelerator facilities. Summary of machine availability over the present and previous years was given. Selected highlights were then given through the whole injector complex.



4. AOB.

- **A. Bland** said that the password will be changed on Tuesday 22nd January.
- **C. Pruneaux** said that the TIOC will continue during LS2 and that issues on operational machines can be transferred to the TIOC via **B. Mikulec** or the TIOC representatives of the running machines.
- **R. Steerenberg** added that a schedule will be drawn up for the operational machines and distributed.

Next Meeting: Probably in 2020.

Minutes reported by [JB. Lallement](#) on 13th December.