# Summary of the 22nd FOM Meeting

## Held on Tuesday 22nd August 2017

Agenda (https://indico.cern.ch/event/fom170822)

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

**V. Kain** chaired the meeting.
The list of presence can be found in Annex 1.

### 1. Follow-up of the last FOM

Minutes of the last meeting were approved.
The planning of the next Technical Stop was presented and approved in the last LMC and IEFC. UA9 run will take place on September 18, before the TS on the 19th of September. The TS will be followed by a COLDEX run.
Technical Stop is scheduled to take 24h.

### 2. Status of the machines

#### Linac2&Linac3

**R. Wegner** reported the status of the Linac2 and Linac3 (Annex 2).
Linac2's availability was 90% and all the faults were due to RF components.

- Starting from Saturday 12 of August, Buncher 1 had missing pulses, quite frequently (6 per minute) and random. During those pulses, the entire RF pulse was fully reflected and not arriving at the cavity. A number of components of the amplifier were replaced which showed abnormalities (a number of control modules, high power directional coupler, amplifier output coupler). Furthermore, the amplifier for the master timing was replaced. Those actions cured the problem on Wednesday 12:30. Since then only 6 missing pulses were recorded in 5 days – a normal behaviour as seen over the past years.
- On Saturday afternoon, a failure of an auxiliary power supply in the RFQ amplifier stopped Linac2 for nearly 4 hours (in parallel with an PS access). The fault was hard to find since no error indicators are available in the old rack.
- On Sunday morning, a major fault of the Debuncher DB10 stopped the Linac. A number of components of the high voltage supply were found broken and have been replaced (anode

rejection filter, high voltage resistor, diode bridge, capacitor). The amplifier tube was exchanged twice, since the first tube (brand new) was faulty.
- In the night to Monday, several trips of the Buncher 1 preamplifier and the Debuncher amplifier occurred. A follow-up is ongoing.

**Question** from **V. Kain**: The issue with Buncher 1 was due to aging?
**Answer**: Yes.

Linac3 was running quite well. There were 2 trips of the Thomson generator. Slight beam intensity fluctuations were seen. On Thursday afternoon, the reason was found to be a small fluctuation of the rise time of Tank1. A few control modules of the amplifier were replaced. The situation improved. Nevertheless, the 2 tubes of the tank1 amplifier will need to be exchanged in the coming weeks to fully solve the problem. The beam intensity is typically between 30 and 40 uA.

### LEIR

**M. E. Angoletta:** reported for LEIR (Annex 3).
Activities:
- High intensity MD in LEIR on August 14.
- LINAC3 MD1678 – dedicated Linac3 MD on August 15.
- HLRF MD for cavities remote control on August 16.
- BPMS MD on August 18.

Issues:
- ER.DWH11 & ER.DEH21 tripped on August 21 and could not be reset remotely. PIPO was called to fix the issue.
- Problems with high voltage stage of cavity CRF43 since August 16 (still under repair).

Excellent progress in cavity remote controls capabilities. Both cavities can now be reliably controlled remotely (ON/OFF). A much improved application program is now available (now Inspector-based) providing additional diagnostics.
LLRF switched to work with cavity CRF41 as operational cavity for the rest of the run.

### PSB

**G. P. Di Giovanni** presented the status of the PS Booster (Annex 4). Availability was only 88%, which is mostly due to the Linac2 issues. PSB issues:
- On Wednesday morning for about 1 hour it was not possible to control the machine because of networking issues with INCA/LSA service, which were fixed by BE-CO support.
- A network glitch on Friday evening caused several equipment to trip, which needed about 10 minutes to recover.
- A trip of one of the recombination kickers (BT2.KFA20) required piquet intervention to replace a timing cable and caused about 1h45 downtime.
- During the week, minor issues with drifting vertical trajectory of the beam extracted from R1, which was always fixed by tuning the recombination septum BT1.SMV10.
- A timeout error for the WS of R3V that appeared during the week-end will require an expert intervention to reset it.

- The 3rd vertical SEM-grid shows a systematic alternate pattern in the transverse profile. BI experts were informed and they are working on it but no solution yet.

**Question** from **V. Kain**: What was the problem for the 1 h stop due to Inca?
**Answer** by **M. Gourber-Pace (**received by email after the meeting): The PSB INCA server ran out of memory. Actually, looking closer, there have been 3 similar events since 9th of August. I asked Vito and the INCA team to try to investigate further.

## ISOLDE

**J.A. Rodriguez Rodriguez** reported the status of ISOLDE (Annex 5).
It has been a very good week at ISOLDE with little downtime due to problems of the equipment in the facility. Availability was 89% for HRS and 91% for GPS. Several important activities were conducted in parallel:

- Set-up of the HRS separator and delivery of several very exotic isotopes of Krypton and Argon to the ISOLTRAP experimental station.
- Set-up of the GPS separator and delivery of an isomeric state of 111Cd to the GLM line for several solid state and biophysics experiments.
- Beam commissioning of the XT03 high energy line and initial preparations for the delivery of 15C5+ at 4.3 MeV/u to the scattering chamber this coming week.
- MD: Transverse beam characterization for different breeding times.

Other than the problems with Linac2, there were some small issues with the tape station, the power converters of the HRS separator dipoles and with one of the electrostatic quadrupoles. EPC controls had to solve a problem with the field regulation of the power converter of the XT03 dipoles. An intervention to place to install a set and to replace another set of stripping foils (very quickly organized and carried out on Thursday by vacuum and BI).

## ISOLDE Users

**K. Johnston**: HRS and GPS were running simultaneously with NORMHRS and STAGISO beams respectively. Apart from the problems with LINAC2 this worked very well. On HRS ISOLTRAP were measuring exotic noble gases 48Ar and 98/99Kr. These are difficult beams with contaminants to be dealt with and low production rates (~100 ions/s or less). Nonetheless good data were measured on 48Ar and the data of 98/99Kr are being analysed.

On GPS Cd beams were delivered to biophysics and solid-state physics, where a wide-ranging programme ranging from the binding properties of chelators used for cancer therapy and solar cell materials were studied. Good data were obtained and the experimental teams are satisfied.

## PS

**H. Damerau** reported the status of the PS (Annex 6). 79% availability the PS was well below an average week. The major part of the downtime was however due to two faults of Linac2, amounting to in total about 20 hours.

- No beams could be transferred from the PS to the SPS any more on Tuesday morning and a cable for the warning timing PEX.WSPS was found cut in building 354.
- During the first half of the week the injection septum was not pulsing on rare occasions. This problem disappeared once additional timing pulse repeaters were installed on Tuesday afternoon.
- On Thursday morning, a trip of the modules 10 to 12 of KFA71 (SS79) caused a vacuum spike. An access for a short inspection of KFA71 was organized later that morning which caused in total 1h50 downtime for all users. Module 12 (SS79) will stay disabled until the injector technical stop in September.
- On Friday, the operations team found that the interlock that should prevent the TOF bunch from being extracted towards EAST did not work anymore. This was apparently due to a bad contact in the distribution of the dump trigger timing (PX.SD48TRDC), as local investigations by the BE-CO specialist fixed the problem.
- For all beams 2h30 and for the MTE beam 2h30 more were lost due to a failure of one magnet of the octupole family PR.ODE. An access was necessary on Saturday and the magnet piquet identified insufficient water flow due to a valve in the ring not fully opened for the magnet in SS50.
- The operational MTE beam for the SPS has been migrated to the production scheme using new multi-harmonic RF sources on Thursday. Apart from minor fine tuning in the SPS, this has been largely transparent. Also, the TOF and EAST beams were tried with this new production scheme, but the users decided to keep the standard cycle to complete a long series of data taking. The migration is now scheduled this week.
- LHC-type beam with 25 ns bunch spacing was delivered for Q22 studies in the SPS with an intensity of more than 1.7E11 ppb and excellent longitudinal parameters.

**Comment** from **M. Gourber-Pace**: Concerning the cut timing cable: 7 control cables were found cut and so far nobody admitted to it.

**Question** from **H. Damerau**: What are the prospects of the LHC 8b4e? It was tested OK in the PS, still several verifications need to be done.
**Comment** from **K. Cornelis**: During the LHC OP meeting this morning, there was a new idea to try the 8be4 beam in the LHC. It is therefore very likely that it will be requested very soon. On SPS side we would like to finish the ongoing HiRadMat run before moving to 8b4e.

### East Area

**B. Rae**. Stable running for all users (T8, T9, T10) apart from a few resets on ZT10.QDE5.

### East Area Users

**H. Wilkens:** Good week.

### nToF

**F. Mingrone:** The dedicated and parasitic beam for nTOF will be put on the new RF control system starting from this Wednesday (tomorrow) morning. From Friday 25/08 to Monday 28/08 morning

there will be a calibration run changing the position of the proton beam in the target to maximise the neutron vs proton ratio. For this, it is required that the BPMs in TT2 are logged in Timber for TOF, EAST1 and EAST2 beams. Regarding the data taking, the week was smooth (no major issues from the poor availability of the beam since we are above the scheduled protons on target). The experiment in the second experimental area (EAR2) will end on Thursday, while in EAR1 the same experiment will continue.

### AD

**Bruno Dupuy** reported on the AD status (Annex 7). Availability was 86%. Activities and issues:

- Monday 14:
  - Access for intervention on BCCCA (Beam Cryogenic Current Comparator version A).
  - Transformer DE.BCT7049 calibration, the value was wrong more than 10%.
  - Optimisation of FTA line (before the target) without relevant effects.
- Tuesday 15:
  - DR.QUAD-TRIM3 was malfunctioning, the power supply did not follow the signal generator. Fixed by First-Line local reboot.
  - The Power-Supply DR.BHZTR48.49 switched between zero and the set value every 10 seconds.
- Wednesday 16 was dedicated to the injection of antiprotons from AD to ELENA. During scrapers MD, lots of micro-channel plates (MCP) detector studies for future beams profile measurement were made.
- Thursday 17:
  - Cavity C02 down due to broken cable on the resonator (AVR), fixed by the specialist.
  - The fast pulsed convertor (MegaDiscaP) DI.BHZ6045 went down. It's very long to restart as only one command can be sent by AD cycle (113 sec). Furthermore, the ramp rate is limited to 300 Amp by cycle so a restart takes (12 x 113 sec) more than 22 minutes for a simple RESET.
  - The BASE experiment did not receive the trigger on the BTV, a specialist fixed this issue.
  - Very bad beam, many instabilities during the ALPHA night shift. The extracted beam fluctuated between 2.5E7 and 1.4E7 antiprotons. The injection power-supply DI.QDE6010 showed significant variations in acquisition which disappeared after a reboot.
- Friday 18 dedicated to the injection of antiprotons from AD in ELENA to improve RF capture.

The extraction intensity was not satisfactory. The settings of the FTA line (before the target) are not at nominal. Continuous adjustment is requirement. The problems of the injection CPS chain contributed to this instability.

### AD Users

**H. Wilkens:** The BASE experiment had only 2 anti-Hydrogen atoms in their trap, they used a shift last week to refill the experiment.

Concerning the situation with the liquid He for the AD experiment. As the ALPHA experiment is warming up this week, there are enough resources to cool the ASACUSA-CUSP experiment this week. For the week of the Jeune Genevois, the cryolab agreed to wok over the holiday. The situation will remain tense as from September. The experiments are requesting up to 24 dewars per week, with a total capacity of the cryolab of about 25 dewars.

### SPS

**K. Cornelis:** reported (Annex 8).

- AWAKE operation continued, interleaved with frequent LHC filling, which was in a semi scrubbing regime.
- In the beginning of the week there was some trouble with the mains (SMD10 and SMD12). After a second iteration of repairs everything was perfectly running as from Tuesday evening. The only trip of the mains since then was Friday afternoon caused by a thunderstorm and without damage.
- On Wednesday, the commissioning of the Q22 cycle continued and, on the ship cycle, studies were done with damper noise assisting the slow extraction.
- On Thursday, an orbit change was discovered due to the sinking of a quadrupole (5.23). During a short access a support was installed to stop the sinking.
- Several hours were lost for fixed target on Saturday because of a failure of the MTE octupoles followed by a problem with the RFQ.
- On Sunday, a long stop was caused by the LINAC source followed by a problem with a distributor kicker.
- HiradMat run started yesterday with up to 144 bunches. This is a really stressing beam because of the intensity. There are some issues with tune trims for this beam currently.
- There are many MKP prepulses missing in the current mode of operation (by design) and in such case the MKP is discharged through a resistor. This is wrongly counted as erratic events and causes interlock action.

**Comment** from **T. Kramer**: Indeed, it should not be counted as erratic events and it will be fixed during next Technical Stop.

### North Area

**B. Rae**: Good week. Following the suppression and later repositioning of a fire-cable in the power converter (there is redundancy) MNP33, the NA62 spectrometer magnet, has been stable. The cable will be replaced by a new one as soon as possible during a dedicated Wednesday MD.

### North Area Users

**H. Wilkens:** Overall a good week, however the NA62 experiment reported issues with the spill quality (50Hz ripple) Tuesday to Wednesday last week. This was due to a problem on the compensation monitoring.

### HiRadMat

Just started, nothing to remark yet.

### AWAKE

No report.

### LHC

No report.

**Comment** from **K. Cornelis:** They have still issue with the losses on 16L2. As mentioned before, it is very likely that they will ask for 8b4e soon.
**Comment** from **S. Hancock:** There should be someone present from LHC to warn us as early as possible and to avoid beam setup in a big rush.

### TI

**J. Nilsen:** Despite some cooling related issues at the start of the week and a power glitch on the 400 kV on Friday end of the afternoon, the week was good. On Wednesday there was an instability in the NA cooling system, a restart solved the issue. On Thursday the Meyrin demineralized water station stopped due to a faulty protection relay.

## 3. Schedule Updates

**V. Kain** presented the latest version of the injector schedule. Next Technical Stop will be on 19th of September.
Tomorrow there will be an Injector MD.
**Comment** from **H. Bartosik:** There will be no beam to NA during the MD time in the SPS due to scheduled interventions in the NA.

## 4. AOB

No AOB's.

**Next Meeting: 29th of August.**

Minutes reported by P.K. Skowronski on 23rd of August.