

# Minutes of the 12th FOM meeting held on 09.06.2009

## Agenda:

- 1) Follow-up of the last meeting (K. Hanke)
- 2) Status of the machines (Supervisors)
- 3) Schedule (K. Hanke)
- 4) AOB
- 5) Results of TI8 tests (J. Wenninger)
- 6) BI review (U. Raich)
- 7) Next agenda

## 1. Follow-up of the last meeting

The minutes of the 11th FOM meeting were approved.

Open actions from last FOM:

- a) the problem of the Linac2 lift repairing will be discussed in the IEFEC, but it will probably happen during the 2010-11 shutdown;
- b) the problem with the MTGA-MTGB, causing a general control black-out last week, has been understood. The problem was generated by a manual reset of MTGA done by error from the AD control room. The MTG then switched automatically on the MTGB, which had an HW problem already diagnosed 3 weeks ago. This caused the bad behaviour of the controls during the last weekend. T. Eriksson added that the reset was done accidentally by resetting specific AD elements.

## 2. Status of the machines

### **Linac2 (R. SCRIVENS):**

The Linac2 watchdog was found to be inactive, as the minimum acceptable beam transmission had been set to zero. This is the second time this year it has happened (the first was in the start up). CO has put a monitoring on the device to check for write events. After the weekend the Linac2 door was found blocked wide open. D. Manglunki agreed to send a gentle reminder to the visit service, although it could have been caused by a private visit. All the colleagues are reminded to close the door when they leave the Linac2 rooms.

The TP9 gallery has now been tunnelled under, and is both anchored and on supports. There is still the work to take the level down to the final Linac4 tunnel level. The passage will remain restricted for the moment (contact R. Morton or A. Baltassat if it is needed to go through).

### **PSB (G. RUMOLO):**

On Wednesday, one of the Q-strip GFA power converters broke. The injection efficiency degraded and only low intensity could be delivered for about 3 hours. On Thursday, the SPS required more intensity on the CNGS user. Large losses were observed for Ring 1. The LLRF piquet had to change the relative phase between the C02-C04 cavities. A correction was done

also for the bunch splitting on Ring 4. The same day, the BLM310 triggered on NORMHRS. The BTY.BHZ301 was not pulsing properly, sending the beam to a wrong destination. On Friday, the BLM201 triggered due the large flux of back-scattered particles produced by the ISOLDE beam when sent to the neutron converter. The BLM has been disabled, since the large flux is normal, however the intensity has been limited due to too large radiation levels.

About the beam status: the LHC beam has been prepared for the TI8 tests at 10% of the nominal intensity as required; the LHCPROBE has been also prepared for the same tests. On Monday, 1 hour and a half were lost for the RF intervention in the PS.

The commissioning of the BWS continued during the week. The emittance measurement done for 1/10 of the LHC intensity showed a disagreement between the SEMGRID in the measurement line and the BWS of about a factor of 2. Moreover, the new application release had some problems slowing down the tests. K. Hanke added that the VELO measurements should finish this week, allowing more flexibility for the beams setting up.

### **ISOLDE (E. SIESLING):**

HRS stopped on Friday. The REX run was stopped also. The 9-gap cavity vacuum problem has been solved by installing a new brazed seal. New spare seals are in production with different methods. The CD0 line had a vacuum problem: the pump needed to be reset many times. The target change was done two days later than foreseen. This risks to cause a reduction of the REX run. A new target for GPS was installed on Thursday. On Friday, after the proton scan, a radiation alarm triggered. It is known that, when the beam is sent on the neutron converter, the flux of secondary particles increases. However, for the first time, the PAX.Y02 gave a radiation alarm. The reason for it was not understood, also because the high radiation level remained also after the use of the neutron converter. RP is following the problem. In the meanwhile, the maximum proton current has been reduced to 1.7  $\mu\text{A}$ . K. Hanke added that the interlock to limit the maximum RF power of the 9-gap cavity will not be implemented since it turned out to be too difficult. A warning panel has been added to remember that the RF power should be correctly programmed. Unfortunately, the vacuum problem of the 9-gap cavity has cost one user run.

### **ISOLDE users (A. HERLERT):**

The user run was very good with a good isotope collection. The only issue was a lower yield for an isotope than expected. It is not clear if this was due to a poor steering on the target or the target itself. Investigations are ongoing since the collection with this yield becomes very slow, it has to last about 5 days instead of few hours. The user could in any case finish a part of the program. K. Hanke added that REX is ready for the next run, which could be shortened due to delayed delivery of the target.

### **PS (A. GRUDIEV):**

The PS had a good week. Beams were provided to all the users and for the TI8 tests. On Friday, RP gave the green light to increase the intensity for nTOF. The problem with the FTA transformer has been solved and 2 cycles per super-cycle were delivered. On Monday, a 2 hours long stop was necessary to repair one of the 10 MHz cavities. D. Manglunki added that a change in beam energy was observed in the SPS for the CNGS and SFTPRO due to the change from the broken cavity to its spare in the PS. H. Camera replied that this could be due to the fact that the broken cavity was the last one to go off during the de-bunching, and the spare probably has a different beam loading causing the difference in the final energy observed at extraction.

**East Area (L. GATIGNON):**

The irradiation facility stopped on Friday. DIRAC requires more cycles and it is starting the data taking on 24 hours. T2K would like to have beam during the long MD.

**East Area Users (H. BREUKER):**

Irradiation will restart on August. The CLOUD chamber is going to be installed and the experiment will be ready in few weeks.

**AD (T. ERIKSSON):**

The setting up of the AD finished one week in advance. This left time to do machine studies to optimise the pbar production. The position of the target has been changed, and the maximum production was found in the theoretical position. A new optics at low energy with a better beta for the electron cooler was successfully tested. The ion profile monitors were tested. Investigations are ongoing for the future PACS experiment. The transformer in the extraction line used to normalise the delivered intensity to the experiment was repaired, since the integrator was stopping at about  $\frac{1}{2}$  of the intensity. There are still doubts about the calibration, that will be checked by BI. An intermittent fault on the PU used for the stochastic cooling could be solved by few resets. However, the PU is necessary for all the cycles. The RF had to be adjusted to solve a synchronisation problem at extraction. The CO piquet had to intervene since it was not possible to edit the cycles on the MTG. On Sunday, the access system to the secondary zone was blocked. One of the doors was then forced by one of the users, but there were not problem with the safety. The piquet could not put the system back in operation, this was done by the expert on Monday. The physics run started on Monday, but the ALPHA experiment was not ready to take data. The second experiment started its run, with the steering of the RFQD. In the evening, a problem with the RFQD power converter appeared. Unfortunately, it is not yet clear who is the responsible for the support during the run. The AD is delivering about  $3 \cdot 10^7$  pbar for an injected intensity after the first cooling of about  $4 \cdot 10^7$  pbar. The new logging of the TFA.7049 is limited to 1 week, then the data are overwritten, whereas is needed for the entire year. CO is following up the issue. R. Steerenberg added that there will be no beam for the AD, and also the other users, for two periods on Monday during the MD. For the rest of the MD block, the beam could be delivered but without full guarantee.

The supercycle for the MD days can be found [here](#).

The unfortunate reset of the MTGA last week was due to a reset of a specific AD DSC which sent also a reset to the MTGA.

**AD users (H. BREUKER):**

The user run started. All the experiments are running.

**NTOF (R. Steerenberg):**

Full intensity has been delivered since Friday, with 3 pulses per super-cycle. On the dedicated beam, up to  $700 \cdot 10^{10}$  ppp can be deliver, whereas on the parasitic EAST cycles, the intensity is limited to  $400 \cdot 10^{10}$  ppp.

A too large fraction of oxygen has been found in the target and an access will be required. This will not stop the beams in the PS.

**SPS (K. CORNELIS):**

On Wednesday, an access was done in the CNGS to fix a communication problem with the temperature probes. At the same time, an access was done to fix the damper amplifier in LSS2. The intensity on CNGS has been raised up to  $4 \cdot 10^{13}$ . A problem with the RF was solved by Friday, and the weekend was very stable with a good production rate. Beams were sent to TI8 for the tests. On Monday, the pumps in 6 stopped. After the restart, the radial position change for the CNGS and SFTPRO due to the cavity change in the PS caused a series of trips of the RF. Furthermore there were a few trips of MPS.

The MKDV1 was out-gassing with the high intensity beams. This is part of the normal kicker conditioning, however it might be a problem for the long MD.

A. Bland added the new SPS page 1 will replace the old one during the last day of the MD block. The old one will be maintained until the start of the LHC. J. J. Gras said that BI will access the machine during the UA9 stop to repair the BWS.

**CNGS (E. GSCHWENDTNER):**

The OPERA experiment is satisfied with the run so far.

**SPS North Area (L. GATIGNON):**

On Friday, the air conditioning had a problem which affected the COMPASS run. The increase of the flux on T6 was beneficial since COMPASS could significantly increase the speed of the lepton run.

**North Area users (H. BREUKER):**

The CMS-CASTOR setting up has been removed without any data taken. The NA61 run finished successfully, with NA63 also with a good data taking. NA62 is now taking data. Despite the many user changes, the run was very good.

**LINAC3 (R. SCRIVENS):**

The source plasma chamber had some missing material where the electron losses would occur. It is assumed this happened with the 18GHz tests. The spare is installed (and the damaged can be considered an emergency spare). The central workshop has a long lead time for a spare, and while looking for other solutions the source will restart with 14.5GHz. A switch can be thought of when we have more information on a spare. The Linac3 start up meeting is this afternoon.

**LEIR: no report.**

LEIR is in shutdown; LEIR matters will be followed up regularly during the run.

**CTF3 (D. MANGLUNKI):**

The work on the MKS03 started on Tuesday morning and by Wednesday the power converter was back in operation, thanks to the good collaboration of PO-RF and transport. One of the HV diodes was broken, but not the same as the last time. Since there was no beam, work has been done to improve the klystron phase stability, which at the end was set to be better than 1 degree. Once CTF restarted, quadrupolar scans were done to improve the optics model. During the weekend, the 30 GHz production run was very good thanks to the supervision of the PS

operators. Since Monday, the commissioning of the delay loop restarted by using a small dp/p beam.

#### **TI (P. SOLLANDER):**

The planned database upgrade was done without any problem.

### **3. Schedule / Supercycle / MD planning**

The 2009 schedule (V3.4) is available at:

<https://espace.cern.ch/be-dep/BEDepartmentalDocuments/BE/Schedule2009.pdf>

During the MD block of next week, beam will be delivered in parallel to ISOLDE. For the PS users, apart two short periods on Monday, beam might be delivered to the users. Please refer to the super-cycle composition ([here](#)) and to the MD schedule ([here](#)) for more details.

The announced upgrade of the DNS servers will be done during the last MD day as the change from the old to the new SPS page 1. The UA9 experiment will do an access during the last MD day to remove one of the detectors. This will require breaking the primary vacuum. During the pumping period, the machine will be closed to prepare the coast needed by the experiment for the next MD. During the access time, BI will intervene on the SPS wire scanners.

### **4. AOB**

### **5. TI8 test results (J. Wenninger)**

J. Wenninger presented the results of the TI8 tests done during the weekend. The presentation can be found [here](#).

During the weekend, the SPS could run with high efficiency both for CNGS as for the TI8 tests.

The beam could be sent at the first shot down the line without any steering, thanks to the realignment done during the last shutdown. More BPMs have been added to improve the measurements of the line optics, since a large mismatch at injection with the LHC has been observed last year. The optics of the line matches very well with the expected one. A sign of large  $b_3$  in the dipoles has been observed. The LHCb experiment was very satisfied about the number of tracks which has been recorded. Those tracks are generated by the protons interacting with the TED at the end of TI8. The experiment could see also the secondaries from the 4 parasitic bunches in front of the batch. Three issues happened during the tests: a) when the LHC takes the timing mastership, the timing system does not behave correctly all the time; b) the WIC (the magnet temperature interlock system) was triggering even without any temperature problem. This might be a SEU, which is quite worrying because the intensities were pretty low; c) two BPMs showed a large offset for intensity larger than  $5 \cdot 10^{10}$  protons.

### **6. BI review (U. Raich)**

U. Raich presented the status of the instrumentation in the injector complex.

The slides can be found [here](#).

The old orbit system of the PS (CODD) was operational since the first day. The new system can run in parallel to the old one, speeding up the commissioning. The new system should replace the old one by the end of the year. BI recommends to use it as much as possible to debug it and to consider it as operational. The expert should be called every time a problem appears.

The BWS has been renovated both in the PSB and in the PS. Unfortunately, it was not possible to have the old system running in parallel. The new electronics in being debugged but unfortunately the expert of the system is absent from CERN. The problem of the calibration which was not enough extended to large amplitude for the PS has been solved. However, the extension has been done using theoretical values, since the calibration table does not allow to measure at amplitudes larger than 30 mm. BI will study possibility to extend this range for the future calibration campaign. In the meanwhile, a cross check of the calibration with beam will be done. J. J. Gras added that the 20 m/s scan speed is not available. S. Hancock asked why the 20 m/s speed does not work even if it was declared in the specification document. J. J. Gras replied that this is not clear. In the laboratory tests and in the PSB tests, the speed was working correctly. For the PS, it seems that there is a difference in the layout or mechanics that the current design can not handle. It is not yet clear how to solve this limitation and probably this speed will not be available this year. S. Gilardoni added that the 20 m/s were necessary to do a full scan of the profiles of the MTE beams with islands and for the LHC beams to be sure of measuring the profile between the last bunch splitting and the phase rotation. First case is solved by the extended calibration window but for the last measurement, the fact of not having an OASIS signal available to check the timing of the measurement is clearly a problem. R. Steerenberg added that the OASIS signal is necessary to be sure that the 15 m/s speed is suitable to measure the emittance of the LHC beams. S. Gilardoni added that a calibration timing signal could be implemented. BI will check if it is possible to input to the system a signal calibrated in time.

The system currently is being debugged by the experts, both for the application as for the HW. To ease the debugging, no more changes to the look-and-feel of the application will be implemented. The problem is that the application expert will leave CERN in August. Then the expertise will be passed to OP. B. Mikulec asked about the SEM measurements in the PSB. J. J. Gras replied that one should test if the SEM signal is really needed. U. Raich replied that the SEM is the only measurement possible at injection, since the energy is too low for the PM measurement. S. Gilardoni asked also for when the BWS main problems will be solved, since the MTE commissioning is now blocked due to the BWS. J. J. Gras said to expect major progresses by the end of the week.

For the SPS, the application was often not available and there are few wire scanners not working at all. There are also doubts also for the calibration, since the cross check of it done by using closed bumps around the scanners showed bad results. S. Gilardoni asked if there is a calibration bench. J. J. Gras replied no because the mechanics is simpler than the one of the PS and PSB. K. Cornelis added that the BWS517 is very important for the LHC beams since it is used for low intensity beams. J. Wenninger added that for the TI tests the emittances could be measured thanks to the OTR screens in the lines. K. Hanke replied that is not acceptable to measure the emittances only in the transfer line because in case of an emittance blow-up, it is necessary to understand in which machine and at which moment in the cycles this happens.

K. Cornelis asked if the BWS415 and BWS521 could be fixed. J. J. Gras added that the BI effort will be concentrated on them.

A renovation campaign of the BCTs has been done during the last shutdown. The BCTs were quite old and no spare were available. New electronics cards have been installed on few of them to start the renovation in parallel with the operational ones. Unfortunately, their commissioning

has been delayed by the fact that the colleague who built the card left CERN. S. Gilardoni asked for when the systems will be operational. J. J. Gras replied that so far the firmware is working in the laboratory and we plan to be ready for operational tests before the Summer holiday period

The new BBQ system is fully operational in all machines.

The commissioning of the new SEMGRID electronics will be done during the MD block next week. If the tests will be positive, all the systems will migrate to the new one.

In general, for most of the system the main problems are related to the fact that the experts left CERN or are not available. The goal is to fix the remaining problems before the summer holidays.

K. Hanke reminded that BI should also finalise the calibration of the AD transformer.

J. J. Gras suggested doing another BI review in July to review BI progress on these issues.

K. Hanke added that the work of the BI colleagues is very much appreciated also for the excellent support. The BWS should be operational in all machines well before the LHC start-up to qualify the beam emittances.

## **7. Next meeting**

The next meeting will be held on Tuesday, June 16th at 10:00 in 874-1-011.

Preliminary Agenda:

1. Follow-up of the last meeting
2. Status of the machines
3. Schedule
4. AOB

Minutes edited by S. Gilardoni