

# Minutes FOM #43, 02.11.2021

Chair: A. Rodriguez

**Participants:** Aguiar Y., Akroh A., Albert M., Amarilla M., Angoletta M., Antoine A., Apollonio A., Asvesta F., Bellodi G., Bestmann P., Bracco C., Damerou H., Di Giovanni G.P., Dos Santos F., Fadakis E., Fernandez R., Ferreira J., Findlay A., Folch R., Gerbershagen A., Haase M., Holzer E.B., Huschauer A., Johnston K., Kain V., Karpov I., Li K., Lozano M., Madysa N., Mahner E., Mataguez S., McFarlane D., Mikulec B., Murillo R., Nielsen J., Pace M., Pittet S., Ponce L., Pozzi F., Praena J., Rodriguez J., Roncarolo F., Rossi C., Salvant B., Schenk M., Skowronski P., Salvatore L., Saint Sulpice B., Schwarz P., Siesling E., Suitbert R., Tecker F., Timeo L., Velotti F., Wegner R., Woolley B.

**Slides:** <https://indico.cern.ch/event/1077873/>

## Agenda

1. Approval of minutes & follow-up of actions
2. Reports from Accelerators & Facilities
3. FGC\_62: PS issues and reasons for upgrade
4. MD requests and dedicated MDs
5. Short-term Injectors Schedule Outlook

### 1. Approval of minutes & follow-up of actions *(A. Rodriguez)*

- **Actions:**
  - o **SPS LLRF crate crash and injection bucket change:** pending
  - o **Cause for LTIM software server crash (LINAC3): M. Pace:** LTIM task that was found dead was not new. Service down since 6. Sept. but not visible until Tue last week. Impossible to do post-mortem now since such a long time ago that issue started. **R. Fernandez:** what do we have to do next time when this happens? **M. Pace:** restarting process is right thing to do. Also, contact frontend responsible any time. **A. Rodriguez:** can close this action.
- **Minutes approved without further comments.**

### 2. Reports from Accelerators & Facilities

#### a) TI *(J. Nielsen)*

- **Tue 26.10. & Wed 27.10.:** patrol lost in BA80 (access card problem)
- **Wed 27.10.:** repeated alarms on sump pump FTDP-00511 BA3. Access to verify if there is leak in BA3. One of sump pump discharge pipes leaked back into sump. Pump isolated, now running on 1 pump. To be fixed during YETS.
- **Wed 27.10.:** e-logbook (accelerators) down. IT contacted by TI but server not with them. Called best-effort BE-CSS, server not with them either. Application under responsibility of its developers in BE-OP.
- **Sun 31.10.:** change to winter time: e-logbook stopped working. Alarm on SUSI DAQ/EHN1, zora access jec comms during time change. JEC problem fixed by restarting service in TIM.

#### Comments / questions:

- **B. Holzer:** one of users went into zone for access, then there was change to winter time. Had issue closing zone again (but person not trapped inside). **J. Nielsen:** this is possible since problem we had was related to access system.

**Action (A. Rodriguez) : Discuss how to proceed with e-logbook to avoid long downtimes.**

#### b) Linac4 *(G. Bellodi)*

- **Availability:** 98.8 %
- **Faults / accesses: 1) Sun:** RAMSES became unavailable with RadMon communication error, losing all monitoring of CPS machines. Piquet had to intervene (40' downtime). **2) Sun:** PIMS5-6 went in fault (overcurrent). EPC piquet called to exchange IGBT driver card (45' downtime). **3)** A couple of short RF and watchdog trips during week.

- **Main activity:** SY-BI conducted tests on SEMgrids. After change in FESA (BI) and SIS logic (OP) all errors now handled correctly. No further occurrence of spurious interlocks observed. All SEMgrids back in operation except those in LBE line. For latter, will need to interrupt wire-scanners (preferable to do during beam stop, if not urgent).

*Comments / questions:*

- **A. Rodriguez:** any comments on losing radiation monitoring on CPS machines? Is it right for OP to stop beams preventatively until issue is resolved as was done this time? **F. Pozzi:** have no additional info on that, but will follow up with colleagues. Right action to stop beams.

**Action (F. Pozzi): Check cause for loss of communication for radiation monitoring in CPS machines.**

**F. Pozzi** (via e-mail, 02.11.21): After discussing communication alarm on CCC PS repeater with colleagues: might be related to time change during night between Sat and Sun, which has impacted REMUS supervision and is still under investigation by REMUS team. Concerning the behavior to be adopted by the beam operator, you can refer to Chapter 5 of [EDMS 1858654](#) (Procedure en cas d'alarme de radiation).

**c) PSB (C. Bracco)**

- **Availability:** 98.1 %.
- **Faults / accesses: 1)** Problem with extraction kicker of R2 during weekend (radiation alarms). Piquet on site could not re-establish stable conditions. Had to go in degraded operation (3/4 rings). TOF with no beam for 5 h. Replacement of thyatron and repair of multicontact done Mon morning. **2)** Erratics of ring BLM FEC triggering PSB4 BIC. Root cause of problem not understood yet. Replacement of CPU during YETS. **3)** Water leak between PSB lift and entrance of RF cage. Not yet repaired due to "unexpected" concrete slab. New solution under investigation.
- **Main activity:** HiRadMat beam prepared, optimized and characterized in PS and SPS. Target emittance of 2.1 – 2.3 um in both planes achieved. 01.11.: scrubbing, 02.11.: BBA in the morning then high intensity (PSB interlock active to keep control on emittance).

*Comments / questions:*

- **A. Rodriguez:** water leak is not an issue? **M. Albert:** this is known problem since 1 year. It is not really a water leak, but water infiltration. SCE fixing attempt failed due to concrete slab that was not on the schematics. SCE will come up with alternative solution. Probably nothing to be done before end of year. In contact with them and following up.

**d) ISOLDE (M. Lozano)**

- **Availabilities:** HRS 93.9 %, HRS : 97.2 %
- **HRS:** radioactive beam to users on Mon, stopped on Tue. Cold target continued being irradiated. Wed: MEDICIS target irradiation.
- **GPS & REX/HIE-ISOLDE:** radioactive beam to ISS. Mon: separator and linac set up. Tue & Wed: REX-TRAP and REX\_EBIS set up. Wed: Proton scan and yields measurements. Thu: delivering beam to users.
- **Faults: 1)** Beam delivery to ISS on Thu, instead of Wed due to problem with cfv-170-crexebis FEC. Source of problem not understood yet. Thanks to M. Hermo and F. Hognin. **2)** Sun: users reported reduction on beam intensity. **3)** Multiple accesses to HT room during target change in HRS due to problem with power converters and PLCs. Downtime for REX/HIE-ISOLDE.
- **This week:** [see slides](#)
- **Coordinator:** A. Rodriguez

*Comments / questions:*

- **M. Pace:** not much to add concerning the cfv-170crexebis issue. Suspect that a client used lots of subscriptions leading to CPU overload. Has recovered by restarting front end, likely since subscription was stopped. Would like to understand why timing events used for DAQ of some devices are not PPM. Team will contact ISOLDE. **M. Lozano:** similar issue on Sun and had to restart several servers and also the subscriptions as there was communication issue. **M. Pace:** if problem occurs during working hours, please call FST team to make online investigations possible.
- **A. Rodriguez:** thank you to PSB colleagues for patience during all the accesses.

e) **ISOLDE Users** (*K. Johnston*)

- This week's experiment took place at HIE-ISOLDE. ISS collaboration taking 61Zn beams at 7.5MeV/u with goal of understanding one of key reactions in rp process in x-ray bursts in nuclear astrophysics. Experiment running smoothly from machine side. Main issues on experimental side with many problems from DAQ. Data being collected are proving difficult to analyse but it is hoped that physics goals can be achieved if present stable running can be maintained until Thu morning.

f) **PS** (*F. Tecker*)

- **Availability:** 88.8 %, but luckily SPS much less affected. Most faults to 1 user (NTOF).
- **Faults / accesses:** **1) Extraction kicker problem PSB R2:** beam unavailable on Sun. Managed to set up TOF beam coming from PSB R3 so TOF operation could be resumed after 5 h. **2) PI.KFA45:** module 3 fault. Kick for TOF could not be provided. EAST\_T8 degraded. Operators took up injection steering from PSB and managed to set up injection with smaller kick. Repaired next morning. 14 h downtime, but only 3 h 20' blocking. **3) F63.BHZ03:** settings change by 75 A to center beam. When EAST\_N played directly after EAST\_T8, beam to very right on TMMTV0009. T8.BHZ03 pulsed on wrong cycle due to missing setting. **4) C10-96:** fault needed expert intervention during weekend. Caused 9.5 h of degraded beam for AD with 3 out of 4 bunches. **5) F63.BHZ04:** tripped twice (3 h 20' downtime for EAST\_N), + 0.5 h for follow-up repair. **6) IRRAD:** patrol lost on Wed. **7) T9 area:** went "not safe" on Sat night. EAST beams could not be provided during 2 h 10'. **8) REMUS radiation monitors:** communication problem caused 1 h downtime for all users. **9) EAST area:** waterflow issues, still occurred again on Sun.
- **Activities:** **1) TOF:** variations on beam size and position on target. Understood to be related to trips of 10 MHz cavity. SIS task in place to monitor. SIS interlock not working yet but will be fixed soon. TOF parasitic beam propagated to all EAST users. **2)** Temperature in central building reached 1<sup>st</sup> interlock level of 26 degC. CV intervened quickly. **3) Wire scanner 65H** stuck, seems like mechanical problem. Luckily outside beam area. **3) HiRadMat:** beam set up with beam from PSB with emittance 2 mm mrad. **4) ILHC75#3b ion beam** accelerated to flat-top. **5)** Started set up beam decelerated to 1 GeV for aperture measurements.
- **Status of operational beams:** [see slide 7](#)
- **Coordinator:** H. Damerou

g) **PS – East Area** (*A. Gerbershagen*)

- **Availability:** 88.8 %
- **T8:** safety clarifications for ion beam permit have taken place. More thorough study with FLUKA/BDSIM simulations should clarify situation. Measurement campaign to connect F61-T8 being organized during YETS by BE-OP.
- **T9:** **1)** LDMX detectors delayed and not able to take intended beam with full setup. Took data with their trigger system and for debugging. Aim to take beam with full setup next year. **2)** HERD: started run from 01.11. **3)** XCETS operational now used by HERD in coming week.
- **T10:** found problem with BHZ01 PSU beginning of week. Not visible in control software. Lucky that users not sensitive to momentum. But would be good to know bending angle in future.

*Comments / questions:*

- **F. Tecker:** think problem in T10 is not related to calibration of magnet on our side. Instead, was caused by stray field from magnet that was not supposed to pulse. **A. Gerbershagen:** will investigate further to find if question of timing or calibration.
- **A. Rodriguez:** concerning measurement campaign in T8 during YETS. What type of measurements? **A. Gerbershagen:** not RP related, but will need to check with colleagues.

h) **East Area Users** (*B. Holzer*)

- Nothing to add

i) **PS – nTOF** (*J. Praena*)

- **Issues:** Module fault from Mon to Tue: BE team able to provide beam with this issue. Thank you to F. Tecker, PS & BE teams.
- **MD dedicated** to nTOF not affecting other experiments on Thu afternoon.

- **EAR1:** physics program for production of  $^{177}\text{Lu}$  for cancer therapy.
- **EAR2:** physics program for astrophysics.
- **NEAR:** commissioning of neutron flux.
- **Total number of protons received up to now:** before LS2, average  $1.06 \times 10^{17}$  protons/day. After LS2: expected  $69 \times 10^{17}$  p, and received  $70 \times 10^{17}$  p. So, well on track.

*Comments / questions:*

- **F. Tecker:** contact H. Damerau to check bunch rotation again for high intensity. **J. Praena:** are working with H. Damerau and M. Hostettler. With slow detector do not see this effect, but with the fast one we do. Trying to optimize.

**j) ELENA / AD (L. Ponce)**

- **Availability:** 94.4 %
- **Activities:** production week with MD on Wed.
- **Issues: 1) Trip of AD horn:** reset by expert. **2) Trip of electro-static orbit correctors in ELENA transfer:** couple of physics hours lost because of insufficient diagnostics and misleading BPM readings at low energy. **3) Period of lower intensity beam** due to PSB problem.

**k) ELENA users (B. Holzer)**

- Nothing to add

**l) SPS (F. Velotti)**

- **Availability:** 87.1 %
- **Main faults: 1) RF:** 3 main stops (upgrades), needed for ion commissioning. **2) Collimator in BA81:** found stuck closed, expert put it in stuck open (see last week's report). **3) Access system:** 3 issues in BA80. **4) Wobbling magnets:** few recurrent faults caused downtime for NA. **5) SFTPRO:** degraded mode due to extraction kicker in PSB (non-blocking for SPS).
- **Activities: 1) LHC:** had last week of 2-week test with beam. Main issue in T18. Pulsing following FGC update over LS2. Significantly impacting LHC orbit. Economy switched off and all working as expected. Needs more solid fix. **2) 2<sup>nd</sup> week of ion commissioning:** 3 h dedicated RF firmware and BC upgraded. By end of week, successfully managed to slip-stack 4+4 bunches and accelerate to flat top with ~50% transmission. **3) SFTPRO:** replacement of collimator in BA81 stopped NA physics for ~3 h. Collimator blocked closed and now blocked open. Recurrent issues on wobbling magnets on both T2 and T4. WOBSU checks current of power converter in 1 A tolerance. Seems to fluctuate a bit. Since Sun morning to Mon missing PSB R2 and SFTPRO in degraded mode. Beam sharing s.t. expected #protons on T4 for NA62.
- **This week: last HiRadMat run this year:** dedicated scrubbing yesterday. 12 h taken for dedicated scrubbing of MKDV1. Had 4 batches of 72 b with  $\sim 1.2 \times 10^{11}$  ppb to flat top this morning. 2 new optics quickly commissioned and larger emittance beam tested. Ready for experiment as foreseen in planning.
- **Coordinator:** K. Li

*Comments / questions:*

- **A. Rodriguez:** issue on wobbling magnets. Is this a real problem for beam quality? **F. Velotti:** have no beam acquisition that tells us if problematic for beam. Just know that current is not within tolerance. EPC tried to replace the card, but not yet clear what is happening. Investigating further.
- **A. Rodriguez:** collimator issue already reported last week? **F. Velotti:** yes. Degraded mode for T4, but not a big issue. Can stay that way until YETS.

**m) SPS North Area (A. Gerbershagen)**

- **Availability:** 87 %
- **Faults:** one collimator got stuck, repaired on Mon.
- **Activities: H2:** NA61 running smoothly. **H4:** collimator stuck, but fixed on Mon. **T4 target:** intensity changed a few times. Reason was NA62 beam dump run. Thereafter, intensity on T4 reduced to 80 units. **H6:** operation ongoing with users taking 120 GeV hadron beam. **H8:** operation as in previous week. Parallel user TOTEM instead of CMS MTD. **M2:** AMBER finished run on Wed. NA64u currently installing in CEDAR region and MUonE is already installed downstream of COMPASS. Safety clearance of NA64u and

MUonE taken place Mon. **P42/K12**: experiment moved today back from beam dump mode to standard data taking.

**n) SPS North Area Users** (*B. Holzer*)

- **NA62 beam**: still battling with inhomogeneous intensity during spill (high-intensity spikes trip part of detector electronics). Otherwise fine.

**o) AWAKE** (*G. Zevi Della Porta*)

- **In access after proton run**: shutdown of Rb vapour source.
- **Activities /issues: 1) RP survey after run**: access issue prevented RP veto removal. RP survey used emergency handle (patrol lost). Problem solved later that day. **2) Cabling for vacuum window**: SPS/AWAKE vacuum window will become vacuum valve. New window to be installed upstream. **3) PXI**: software upgrade test.
- **This week**: cabling for BPM tests foreseen in Nov13 proton run. Follow up on water leak observed on Fri (raining on e-gun).

*Comments / questions:*

- **A. Rodriguez**: e-gun is at high voltage. **G. Zevi Della Porta**: yes, but everything was switched off. Vacuum related equipment was switched off only this morning. Saw some bad behavior. To be checked.

**p) HiRadMat**

- No one to report

**q) LINAC3** (*G. Bellodi, for D. Küchler*)

- **Availability**: 99.2 %
- **Activities**: stable beam operation all week long.
- **Faults: 1) Wed**: source microwave generator tripped. Similar fault as week before. Following up with manufacturer. **2) Fri**: RFQ tripped, but could be reset without problem.
- **This week**: oven refill on Thu.

*Comments / questions:*

**r) LEIR** (*R. Fernandez*)

- **Activities: 1)** Delivering beam to SPS. Beam has been very stable in LINAC3 and LEIR. **2) MDs** on resonance compensation and instabilities with transverse feedback team.

**s) CLEAR**

- No one to report

**t) LHC**

- No one to report

**3. FGC\_62: PS issues and reasons for the upgrade** (*R. Murillo*)

- **Motivation for deployment of class FGC\_62**: FGC log at 500 Ksps, critical to visualize pulses of  $O(ms)$ . Log not correctly stored when converter tripped. Did not affect operation but important for diagnostics for power converter experts. Deployed on Linac4, PSB and CPS on 21.10.21.
- **Issues: 1) LT.DHZ50**: spurious bad pulse. Resolved by resetting FGC3. *No link with class deployment.* **2) PI.SMH42, PI.PBSW40, PI.PBSW42, PI.PBSW43, and PI.PBSW44**: go offline and communication is lost every  $\sim 40'$ . Reset of FGC3 needed. *Not yet understood. Might have been caused by new release. Trying to reproduce in lab.* **3) PE.BSW22**: pulsing with errors for users TOF, AD, and EAST4. Todor fine tuned converter to accept reference close to limit. *No link with class deployment.* **4) PI.\* devices**: for some users devices still publishing inaccurate acquisition although converter pulsing correctly. Affected by value of REF.PULSE.OFFSET\_US. *Bug with how sample closest to time event selected and published. Present before deployment. Currently getting fixed.* **5) Beam losses at PS injection**: some devices seem not to pulse at

operational reference. OP required to tune them to reduce beam loss. *Inaccurate acquisitions should have been present before upgrade. Investigations ongoing.*

- **Future actions: 1)** only two converter families affected (only found in PS) which explains why issues only observed there. **2)** At 22:00: Q. King rolled back class FGC\_62 on PS. **3)** New release with fixes will be deployed during YETS. **4)** 5-day IST requested to validate fix on one of converter types.

*Comments / questions:*

- **B. Mikulec:** question of how to avoid this in the future. Deployment was considered transparent, and difficult to test before. For this kind of releases, can we define procedure where deployment expert and OP are together in CCC during upgrade and then test together if all functions well after restart. **R. Murillo:** fully agree, need to formalize release. Usually in CCC during release. Critical issue is that devices went offline. For acquisitions less critical. Have also the 5-day IST. **M. Pace:** plan 5-day IST for that – what is motivation for deployment during operation? Could it have waited until YETS? **R. Murillo:** in hindsight, release during operation should have been avoided. Similar releases have been done in the past and usually are a matter of 30'. Agree that generally should minimize deployments during operation.

#### 4. MD plans (A. Huschauer)

- **Last week:** no dedicated MDs due to LHC test beam and ion commissioning week. Very busy in terms of parallel MDs.
- **This week:** dedicated LINAC3 MD on Wed. Dedicated MD on FTN optics on Thu afternoon (no beam for nTOF). Very busy parallel MD schedule in all machines.
- **Next week:** dedicated Linac4 MD on Wed afternoon (12:00 – 18:00): MD6084 Adjustment of RFQ tuning. No beam for proton physics.

*Comments / questions:*

- **B. Holzer:** for coming week Thu: dedicated MD scheduled for slip-stacking. Could it be turned into a parasitic one instead? **K. Li:** last week was a scheduled ion MD. Have quite a few items on list. This week will not impede NA as they have priority. Next week: there are still a few things to be done – ions scheduled for 2 days, taking 14 injections. Since according to schedule, should be carried out to make slip-stacking work. **B. Holzer:** does it have to be dedicated? **K. Li:** this time we will have to take 14 injections which is beyond 1-minute supercycle. In that sense MD will be dedicated. **A. Huschauer:** in principle it is still parasitic, but with a reduced duty cycle. **B. Holzer:** is there hope that for some of this time there will be some beam for NA? **K. Li:** will check and get back to you.

**Action (K. Li): Get back to B. Holzer concerning dedicated ion MD in W45 – will there be any beam for NA?**

#### 5. Short-term Injectors Schedule Outlook (A. Rodriguez)

- **This week:** 3<sup>rd</sup> HiRadMat run
- **Next week:** ion commissioning in SPS and 4<sup>th</sup> AWAKE run during weekend.
- **W46:** 15.11.21, 6 AM: all beams, protons, and ions stop and go into YETS.
- **Schedule changes:**
  - o Linac4 extended run request still under IEFC, awaiting decision.
  - o ISOLDE planning to extend run up to 3 weeks after 15.11. Equipment groups: keep that in mind.

*Comments / questions:*

- **M. Pace:** has ISOLDE extension been approved by IEFC? **A. Rodriguez:** do this quite often, we run with whatever constraints there are. Can find a way to coordinate with you in case controls are affected. **M. Pace:** good to know since we will be in YETS and there will be perturbations on control system. Will extension be visible in the planning? **A. Rodriguez:** is already in ISOLDE planning. Can add it to the main schedule.

**Action (A. Rodriguez): add ISOLDE run extension to main planning.**