Minutes of the HSC section

46th meeting on Monday 01/06/2015 (14:00, 6/R-012)

HSC members: Olav Berrig (OB), Christian Carli (CC), Elias Metral (EM), Giovanni Rumolo (GR), Frank Schmidt (FS), Elena Wildner (EW), Elena Benedetto (EB), Michael Bodendorfer (MB), Kevin Li (KL), Tatiana Pieloni (TP), Benoit Salvant (BS), Guido Sterbini (GS), Daria Astapovych (DA), Meghan McAteer (MM), Nicolo Biancacci (NB), Alexander Huschauer (AH), Giovanni Iadarola (GI), Adrian Oeftiger (AO), Serena Persichelli (SP), Tatiana Rijoff (TR), Letizia Ventura (LV), Claudia Tambasco (CT), Magdalena Kowalska (MK), Andrea Passarelli (AP), Annalisa Romano (AR), Michael Schenk (MS), Vincenzo Forte (VF), Javier Barranco (JB), Aaron Paul Axford (APA), Malte Titze (MT), Francesco Paciolla (FP), Mario Stefan Beck (MSB), Stefan Hegglin (SH), Alpo Valimaa (AV), Hannes Bartosik (HB), Lee Robert Carver (LRC).


1) Newcomers / visitors
- None.

2) Comments on the minutes of the previous 45th meeting + Actions
- No comment.

3) General infos
- SL meeting:
  - Do we have any request for technical students (equivalent programme for technical engineers) and French VIA (Volontaires Internationaux en Administration)? Deadline: end of this week.
  - Reminder: Roaming could be very expensive (somebody spent 400 CHF in one month). Be careful…
  - Was decided to (during directorate meeting) to outsource the email anti-spam service to an external provider.
- The on-site emergency service from the Geneva HUG is operational. Note that it is only intervening in Switzerland and in both CERN sites, but not in the French part.

- There was another attempt of cable thefts in BA40 (seen with cameras).

- FAIR (GSI) went through a major review and some decisions have to be taken. As a consequence, any additional request from GSI should be kept on hold before the situation is clarified.

- The MTP is being reviewed with idea to reduce the peak deficit (which should be reached in ~ 2018) to 350-380 (before it was ~ 500 MCHF). For instance, it is almost clear that LS2 will start in 2019 (instead of mid 2018) and will be longer (restart in 2021). As a result of that, LS3 will move and HL-LHC will be stretched, etc. In addition there will certainly be some fine-tuning in operational budgets.

- As already discussed, a medical machine should be proposed in Spain and there will be some requests to contribute for the design and the instrumentation in particular.

- Official reply regarding the French law on the use of CERN vehicles with Swiss plates => I sent you the email already.

- ABP annual report => Many thanks to those who contributed.

- FCC hadrons injector => Discussion with GiovanniR et al. about the potential beneficial effect of chroma to decide on the vacuum chamber height (to be studied in some detail).

- Ecloud, SC, PyHEADTAIL and Impedance meetings (BB this afternoon).

- Very nice results in the SPS: fix-lines measured!

- SPS scrubbing run started today for 3 days. LBOC tomorrow to continue and prepare the coming LHC scrubbing run.

- LHC collisions should be foreseen for next Wednesday (confirmed).


4) Brief performance reports for the different machines

- PSB (ElenaB)

  - See picture: [https://espace.cern.ch/be-dep/ABP/HSC/Meetings/PSB_1june.pptx](https://espace.cern.ch/be-dep/ABP/HSC/Meetings/PSB_1june.pptx).

  - A good week for the PSB with one major issues to report. E. Benedetto has applied the high working point to LHC50 to reduce transverse emittance. BI specialist continues to investigate the injection pick-up problem.
- PS (GuidoS)


- It was a good week for the PS without major downtime related to the machine. The SFTPRO intensity was increased from 1600 to 1800e10 ppp mainly by optimizing the angle of the septum 16 blade (increased by about 2 mrad). In this condition the losses on the PAXP304 were lowered and we could run under the limit of the 20 uSv/h (level A threshold). Investigations are continuing in particular to optimize the extraction trajectories to meet the 2000e10 ppp target. During the week the work on the commissioning the optics for the T8 line (IRRAD/CHARM) progressed very well. As requested by LHC, the LHCINDIV doublet beam (low intensity and large longitudinal emittance) was prepared and send to the SPS. Concerning the MTE, good progresses were done extracting the islands on the other side of the dummy septum. The SPS scrubbing beams (LHC25 Scrubbing, LHC25 double and BCMS) were played and measured. The beam intensity is respectively 2.1e11, 2.1e11 and 1.75e11 ppb.

- SPS (HannesB)


- The issue with the HiRadMat and LHC25 extractions has been solved but we have more longitudinal losses that in 2012 (Q20 optics instead of Q26). One shot of 288 bunches of LHC25NS causes an interlock each time. After each shot, we have to wait for 70 s without beam.

- LHC and HL-LHC (EliasM)

- Some instabilities observed by OP and some dedicated studies made (instabilities and collimators impedance) => Ongoing analyses. Some predictions were made with NHTVS (https://espace.cern.ch/be-dep/ABP/HSC/Meetings/SB_6p5TeV_7p5cm%20(1).pdf) and DELPHI (https://espace.cern.ch/be-dep/ABP/HSC/Meetings/LHC_runII_SD_OctCurrents_NB.pdf). To be discussed in more detail next week.

- See pictures: https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Screen%20Shot%202015-06-01%20at%2009.21.14.png and https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Screen%20Shot%202015-06-01%20at%2009.21.47.png and https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Screen%20Shot%202015-06-01%20at%2009.22.07.png. ADT are now back as before but B1H still saturates before the others (starting at ~ 2 TeV), meaning that the ADT damping time for B1H is ~ predicted to be 150 turns (still need to be measured).

- LEIR (MichaelB)

- Excused.
5) Summary of 1-beam and 2-beam stability predictions for LHC in 2015, from injection till collision (All people involved): Part 5

- ClaudiaT discussed the LHC 2015 injection tune footprints, considering octupoles and/or BBLR (https://espace.cern.ch/be-dep/ABP/HSC/Meetings/injection_footprint.pdf) =>

Summary:

- Assumptions:
  - LHC 2015: 25 ns, 1.3E11, \( \varepsilon = 3.75 \mu m \)
  - LHC 2012: 50 ns, 1.6E11, \( \varepsilon = 2.2 \mu m \)
  - Xing angle = 170 microrad.

- **BBLR only : \( \sim 7E-4 \) in H&V in 2015** (and \( \sim 4E-4 \) in H&V in 2012) => Similar spread due to BBLR only in IP1&IP5 for LHC 2012 and LHC 2015 at injection (bit larger for LHC 2015).

- **Octupoles only (+/- 6 A)**: \( \sim 1.2E-2 \) in H&V in 2015, i.e. much larger than BBLR (and \( \sim 7E-3 \) in H&V in 2012) => Larger spread for LHC 2015 with the same octupole current of 2012 (+ - 6 A) due to the larger emittance.

- The same spread of BBLR can be reproduced by the landau octupoles with a current of \( \sim 1A \) in both cases.

- Note: there are some typos on some slides (e.g. on last but one: LOF > 0 should be LOF > 0 + BBLR).

- GiovanniR discussed the predicted e-cloud tune footprints due to both dipoles and quadrupoles, vs. the SEY (https://espace.cern.ch/be-dep/ABP/HSC/Meetings/for_hsc_meeting.pptx).

- Assumption: 1.3E11 p/b. DIPOLE means all the dipoles of the LHC and QUAD means all the quads of the LHC.

- **DIPOLE**
  - Asymmetric tune footprint (due to asymmetry of magnetic field).
  - SEY = 1.55 => Tune spread of \( \sim 1.3E-2 \) in V and \( \sim \) few 1E-3 in H.

- **QUAD**
  - Symmetric tune footprint (neck-tie similar to SC and BBHO, with head and tail of the bunch less shifted).
  - SEY = 1.25-1.3 => Tune spread of \( \sim 2E-2 \) in H and V.

- The space charge tune spread in the presence of octupoles will be discussed the next time.
6) Actions to be taken for the next meeting

- List of all actions: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/Actions.aspx.

7) Miscellaneous

- The next (47th) meeting will take place on 08/06/2015 => Agenda:

  1) General info and follow-up (EliasM)

  2) Brief performance reports for the different machines (PSB, PS, SPS, LHC and LEIR) => With ideally a picture of the week!

  3) Summary of LHC stability issues and collimator impedance measurements (NicoloB et al.)

  4) Highlights of the SPS scrubbing run (GiovanniR et al.)

- Important events and dates for HSC: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/EventsAndDates.aspx.

- Preliminary agendas for the next meetings: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/MinutesOfMeetings.aspx.


Minutes by E. Metral, 03/06/2015.