

Minutes of the HSC section

129th meeting on Monday 04/12/2017 (10:30, 6/R-012)

Present: See <https://docs.google.com/spreadsheets/d/1fZiu3vtf546odhd2ONxtW0mx9p8cV-fURT9Kxi7QCys/edit#gid=0>

1) Newcomers / visitors

- None.

2) Comments on the minutes of the previous 128th meeting + Actions

- Actions XavierB:

- What happens to the injection oscillations in the presence of beam-beam, impedance, e-cloud, etc.? => It might be wise to try and minimize the beam-beam coupling, which is mainly due to the BBLR, i.e. we should increase the Xing angle (but the effect goes linearly with the BBLR distance).

- Check the different roles of IP1 and/or 5, or 2 and/or 8? Similar for all of the them due to the linear dependence.

- Effect of polarity? Probably it has an impact...

- Effect of the parallel separation? It is small compared to the one of the crossing angle.

- The orbit effect at injection (~ 0.4 sigma oscillation) is predicted to have a negligible effect of the transverse emittance growth, even for intermediate (~ 50 turns) ADT gains => What about HL-LHC?

- Actions from last WP2 meeting => Action NicoloB and SergeyAnt

- "... This needs to be done in any case for the high frequency HOMs which are present also with longitudinal RF fingers installed".

- "Gianluigi proposes to identify one or two critical HOMs close to delicate components to be provided for a thermo-mechanical analysis to assess heating and outgassing".

- "Chiara asks if issues could appear also in the transitions next to the TDI. This is

confirmed by Elias and Nicolo. Evaluate the impact of the transitions”.

- “Elias adds that at some point stability studies need to be performed in addition of heating studies”.

=> Was said that it will be for end November.

- Long-term upgrade/replacement of TRAIN => To be finalized with YannisP and XavierB by end September (**Action EliasM, YannisP and XavierB**).

=> News from XavierB:

- We have the order of magnitude and someone to work on it.

- RamaC has some info as concerns the CCs. And we could work on the phase advances to mitigate possible issues if needed (by November we would be able to state if it works).

- aC coating of HL-LHC: What would be the effect on beam stability and TMCI? **Action NicoloB and SergeyAnt**.

- Reminder from Giovannis: If the sectors would be as the good one, then we would not need to coat.

- If fact LHC could be coated $\sim 1/2$ or $\sim 1/3$.

- Might be good to review the effect for the SPS.

=> News from BenoitS (from a recent talk from TE-TM): The temperature of the new a-C coated shielded beam screens in Points 1 and 5 will be higher than the usual 5-20 K: 60-80 K is currently contemplated.

- HE-LHC impedance model: after discussion with FrankZ, the goal would be to have a first model by mid October (**Action BenoitS**).

- Invitation to write an ICFA BD NL article => Ongoing.

- HE-LHC review next week.

- Action from a WP2 meeting (Themis, Riccardo and Elias)

- The CC feedback system appears to be effective in fighting the emittance growth due to CC noise; however there are additional points to be addressed:

- Pick up location and achievable beta function.

- Interplay with the ADT, especially in the presence of impedance.

3) General infos and follow-up (EliasM)

- LHC 08:30 meeting => Nothing special. Reminder: some blow-up observed after the special run. XavierB reminded us that it was a reset-up and then it disappeared.

- SLM:

- Discussion about TSC with many requests and some cuts had to be done.

- Update on travel requests.

- Frank Gerrig will replace Karl Schirm as SL for the SC RF Cavity Technology.

- Verena Kain will replace Karel Cornelus for the SPS OP.

- Tentative dates for the CERN SC meeting: 05/03/18-07/03/18.

- LER workshop => Any proposal from our HSC side, e.g. LottaM, BenoitS or EiriniK? => Please contact YannisP.

- Sergey Nagaitsev (from FNAL) will be at CERN for 2 days on 05-06/02/2018 => I will try and organize a talk within our section on Monday and a general seminar on Tuesday.

- CCs: new table sent by Zenghai Li => The new CCs comply with the constraints: Great => See

https://indico.cern.ch/event/685549/contributions/2811533/attachments/1569424/2474932/Update_on_RFD_cavity.pdf

- SPS injection losses review => Seems it was very interesting.

- IPAC18: everything is OK? => Flight, abstract submission, etc.

- BBL meeting with talk from GianniI (https://indico.cern.ch/event/684338/contributions/2805473/attachments/1568753/2473733/a018_beam_beam_6D.pdf), where he reviewed the 6D beam-beam interaction step-by-step.

- Some news from AlexeyBurov on effect of space charge on TMCI and SPS TMCI: <https://arxiv.org/abs/1711.11110> => Still vanishing TMCI predicted... To be continued.

- Some equipment for the PS CT will be removed, as we will use MTE now and it was decided to dismantle the old CT. In the framework of LIU and PBC, it will be important to update the impedance model => GiovanniR and BenoitS are (already) following this up.

4) Follow-up of actions (Everybody)

- Question from RoderiKB to impedance team: "...From the discussions 1 year ago (https://indico.cern.ch/event/585875/contributions/2360017/attachments/1367108/2071469/rev-iew-margins-2016-2017_NB.pdf), I understood that going to a 1 sigma retraction TCP-TCSG did not present any showstopper from impedance. Do you think this is still the case, or has there been any new findings during the year? Just to be fully clear, the settings we are (possibly) considering are to keep the TCP at 5 sigma as this year, but to move in the TCSGs from 6.5 to 6 sigma..."

=> Our answer: according to predictions it seems indeed not to be a problem but with the results of 2016-2017 operation/MDs the situation seems more critical => XavierB discussed it at the 2nd Evian prep meeting.

5) Analysis of single-bunch instability rise-times at top energy using the bunch-by-bunch activity monitor data (GiacomoM) => https://indico.cern.ch/event/685549/contributions/2811536/attachments/1569410/2474905/Rise_Times_LHC.pdf

- Different set of data coming from the ADT activity monitor have been analysed (from fill 6057 to 6411) => Data from the logging database.

- All plots were produced for high energy.

- Most of the time it was B1H single-bunch.

- The biggest part of the rise times is between 2 and 4 seconds, i.e. as predicted by DELPHI => Very promising results. To be continued!

6) First highlights of last week's LHC MDs (Everybody involved) => See LHC 08:30 meeting:

https://indico.cern.ch/event/671961/contributions/2748639/attachments/1569271/2474884/MD4_overview_8-30.pdf

- BTF

- With no ADT and 500 A in Ioct the beam was stable but with BTF ON it became unstable => To be followed up.

- We can make now nice stability diagram but close to instability threshold we cannot measure...

- Q" => Issues with the knob.

- BBLR coupling
- Nominal fill with 16L2
- SB instability threshold with flat orbit
- Train instability
- Head load at injection with orbit bumps

7) General discussion about the 16L2 instabilities (Everybody)

- No news.

8) Progress/status in the different activities/projects and reports from meetings and in particular the issues/successes in the different machines (Everybody)

- ATS-IWG (BenoitS)
 - Not discussed.
- HSC-IWG (NicoloB)
 - Not discussed.
- Ecloud (GianniI)
 - Not discussed.
- Beam-beam (XavierB)
 - Not discussed.
- Space charge (AdrianO)
 - Not discussed.
- ABP-CWG (GiovanniR)
 - Not discussed.
- PyHEADTAIL (KevinL)
 - Not discussed.

- DELPHI (DavidA)
 - Not discussed.
- NHTVS (SergeyAntipov)
 - Not discussed.
- LIU (GiovanniR)
 - Not discussed.
- HL-LHC
 - TCC:
 - Not discussed.
 - WP2:
 - Not discussed.
- FCC
 - Not discussed.
- PBC (GiovanniR)
 - Not discussed.
- Machines
 - Not discussed.
- MDs (past and future)
 - Not discussed.

9) Miscellaneous

- The next (130th) meeting will take place on Monday 11/12/2017 (in room 6/R-012 at 10:30)
=> Current agenda:

- 1) General info and follow-up (EliasM)
- 2) Follow-up of actions (see past minutes) (Everybody)

- 3) LEIR impedance and beam instability studies with Xe39+ (NicoloB)
- 4) Update on new impedance formula and new collimator shape (OlavB and AntonioG)
- 5) General discussion about the 16L2 instabilities (Everybody)
- 6) Progress/status in the different activities/projects, reports from meetings and in particular issues/successes in the different machines (Everybody)

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

- Web site: <https://espace.cern.ch/be-dep/ABP/HSC/default.aspx>.

Minutes by E. Metral, 09/12/2017.