Minutes of the HSC section

116th meeting on Monday 21/08/2017 (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 116th meeting + Actions

- Action EleonoraB: Produce a single plot with the 2 TMCI curves (i.e. without and with longitudinal wake) superimposed => Ongoing and should be presented at the next HSC meeting.

- Action GiovanniR and EliasM: plan to be defined to put together e-cloud and ions simulations => Done (LottaM is following this with GiovanniR).

- Action BenoitS and OlavB: Plan the LMC talk about BGI impedance aspects => Done (end of September).

- Action ArekG: Is the issue with dBLMs vs ADT due to some intrinsic limitations from the dBLMs or do we need just more time for the detailed analysis? => Some limitations solved and analysis still ongoing. Might need to postpone the LMC talk.

- 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?

        - Effect of polarity?

        - Effect of the parallel separation?

    - 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?

3) General infos and follow-up (EliasM)

- I created a Google-Sheet for the presence to the HSC section meetings (https://docs.google.com/spreadsheets/d/1fZiu3vtf546odhd2ONxtW0mx9p8cV-fURT9Kxi7QCys/edit#gid=0)
=> Seems to work for everybody and it should be used from now on. Many thanks in advance!

- SLM:

  - SimonB will end his mandate as HSE department head, DorisFW will take over from 1.1.2018.

  - We are reminded that travel authorization should be signed BEFORE the trip takes place. Under discussion is what to do in the case of students: shall the university supervisor also agree? In this case it cannot be done by EDH. Not yet decided what to do.

  - Reminder: Recruitment of a person from a non-member state can take place only after a board for the post has been unsuccessful and no member-state candidate can be found. Approval of the DL for hiring a non-member state person might also become necessary.

  - Evian workshop: RendeS will take over the organization from MikeL.

  - Chamonix workshop: preparation will start in September. This year emphasis is on the preparation for the HL-LHC and LIU cost and schedule review (March).

- Proposal from GA for injection studies: test the interleaved injection B2-B1 instead of B1-B2 as usual.

  - Do we see any change?

  - Should we also try to inject only B2 (as it has a better lifetime) and then B1? To be followed up.

- Last LMC devoted to review the 16L2 issue (BLM, vacuum, cryo, etc.) and MiguelJ has been nominated 16L2 coordinator to coordinate the future work on this.

- LBOC

  - Last one devoted to LHC@30cm => Will be reported at LMC next week.

  - Tomorrow's LBOC devoted to transverse coherent activity at LHC injection (LeeC).

- LSWG with talks from LeeC, ClaudiaT and JavierB.

- LHC instability studies:

    - B1V blow-up back again with ~ 1900 bunches on Friday => There was a change of filling scheme wrt before with ~ 1700 bunches.

    - B1 coupling has been measured at the EOF and was ~ 0.004.

    - B1H tail was measured to be much worse compared to the others

        - When does this tail develop?

        - Impact on stability diagram?

- HL-LHC at ultimate energy of 7.5 TeV => Some actions from us by the end of September

    - StefanoR should send us the settings for collimators by the end of the week.

    - Then we should assess the impact on beam stability (SergeyA, AdrianO, AnnalisaR)

        - Impact of higher energy on beam stability for proposed collimator settings.

        - Assuming sextupoles and octupoles being able to operate to 600 A, assuming constant kick voltage from the damper.

        - Electron cloud driven instabilities => Impact of higher energy.

        - Any intensity (number of bunches or bunch population) limitation?

    - E-cloud and synchrotron radiation effects => GianluigiA, GiovanniR and GianniI

- Actions from last WP2 meeting => NicoloB and SergeyA

    - "… 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".

- Long-term upgrade/replacement of TRAIN => To be finalized with YannisP and XavierB by end September.

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

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

4) Discussion about the plan for next LHC MD block (Everybody):

- 3 MDs to be discussed: 8b+4e, TMCI and HL-LHC (and/or B1H studies)

- 8b+4e

    - 1st fill physics with ~ 100 bunches => high pile-up etc.

        - Discuss with XavierB the lessons from high-brightness MD, VdM scans with many bunches, etc.

    - 2nd fill with ~ 600 bunches => Xing angle reduction with 90 microrad (BB MD) and then scraping.

    - 3rd fill with full machine.

    - As mentioned by FreddyB this morning, this beam could be used for physics in a near future…

- TMCI threshold at top energy:
https://indico.cern.ch/event/660515/contributions/2694629/attachments/1510296/2354934/2017-08-21_HSC_MD2490.pdf

    - Reminder: Limit is 3E11 p/b for the safe beam (for the total intensity) and we want to have some margin.

    - The HL-LHC impedance could be tried during this MD.

- HL-LHC (and/or B1H studies)

    - On B1 we will re-try the 144 bunches MD (+ 1 bunch) and on B2 we will inject a ~ HLLHC bunch to study its stability.

    - Reminder: BTF with more than one bunch is not possible.

5) Low-impedance collimators for HL-LHC (SergeyAntipov): https://indico.cern.ch/event/660515/contributions/2695331/attachments/1510274/2355044/Coatings_in_IR7_21.08.17.pdf

- New procedure to show our results

  - Only show the delta in Ioct (for a certain chromaticity and ADT gain) for the different cases (and the different contributions to the impedance model) compared. It might be good to have this info both on plots and in tables.

  - We should also put ourselves in the most critical case, i.e. assume the transverse emittance that we have at injection (as the blow-up might not occur at injection) => Update the plots etc. using the emittance at injection, i.e. 2.0 for the nominal HL-LHC and 1.7 for the BCMS beam.

- Slide 6: it is the imaginary part of the impedance (linked to the real tune shifts) and it is for Q' = 10. Action (not urgent): redo the same for different chromaticities.

6) 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):

  - https://indico.cern.ch/event/660515/contributions/2694627/attachments/1510320/2354975/Impedance_news.pdf .

  - Can an impedance be the source of the different heat loads observed in the LHC sectors? This is being followed up by FrancescoG and it will be reported at the e-cloud meeting this Friday
  => See: https://indico.cern.ch/event/660515/contributions/2694627/attachments/1510320/2355005/Can_an_impedance_be_the_source_of_the_observed_differences.pptx .

7) Miscellaneous

- The next (117th) meeting will take place on Monday 28/08/2017 (in room 6/R-012 at 10:30) => Current agenda:

  1) General info and follow-up (EliasM)

  2) Simulation studies for the transverse coherent instability linked to 16L2 losses in the LHC (LottaM)

  3) Transverse emittance blow-up of the first bunch of the trains, except the first one: 2015-2016-2017 (KevinL)

  4) Towards an LHC optics model in PyHEADTAIL (Felix Pol Gaston Soubelet)

  5) Progress/status in the different activities/projects, reports from meetings and in

particular the 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, 25/08/2017.