Minutes of the HSC section

134th meeting on Monday 26/02/2018 (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 133rd meeting + Actions

- Reminder to fill the HSC presence sheet!

- Follow-up of OlavB on new possible low-impedance collimators: https://indico.cern.ch/event/703568/contributions/2886277/attachments/1602510/2541211/PBCI_simulation_of_4pole.pdf => Slides sent by OlavB (for the last HSC section meeting) who could not be present at the meeting: to be discussed today.

    - Erion Gjonaj (from TU Darmstadt) confirmed that the dipolar impedance of the 4-pole structure proposed by OlavB is the same in all directions (as is the case for a circular beam pipe).

    - Comparing to the circular case, it is seen that the 4-pole structure has a wake function about 20% lower compared to the circular beam pipe.

    - Next

        - Compare to 2 // plates (simplified version of the LHC collimators) => Should be ~ 20% lower (Yokoya factor Pi^2 / 12) and therefore the 4-pole structure should have a wake function very close to 2 // plates: to be confirmed. If it is the case then there is no real interest to propose such collimators. Next:

            - Would these new collimators be better / worse from collimation point of view?

            - These collimators would lead to 0 detuning impedance: can this be confirmed? Could this be better?

        - If there is no interest to have such a 4-pole structure, are there other structures, which could be better?

- Conclude and document all this study.

3) General infos and follow-up (EliasM)

- SLM: Nothing worth reporting for the section.

- I went to PSI on Thursday and Friday with the JUAS students => Very well organized and interesting visit.

- Question from collimation team to BenoitS and impedance/stability team: impedance limits with crystal? Ongoing (knowing that crystal should be used only with ions).

- Instrumentation in 31L2 (GianniI after meeting with LaurentT)

  - Solenoid will be installed in the interconnection between the "D3" and the "D4" magnets, where the strong localised heat is detected by the cryogenic measurement. The setup will be identical to the one in 16L2.

  - 2 bundles of BLMs (like the one in 16L2) will be installed on the two sides in order to detect small losses from the two apertures, 5 meters away from the interconnect (i.e. the most sensitive location if the heat source is close to the interconnect).

  - 5 additional single BLM will be also installed in the area in order to better localise the losses (detailed sketch to be prepared by AntonL).

  - Another bundle is prepared and could be installed at a later point based on the observations that we have with beam.

- Impedance meeting (NicoloB)

  - N.Biancacci: Slices and wake functions / wake potential as wake function approximations.

  - M.Beck: Current status of MKE wire impedance measurements analysis.

- E-cloud working group tomorrow => I will not be able to join due to the impedance board.

- Many thanks for all the papers, MD notes, etc. => Some already commented and some will be soon.

- IPAC18

  - Grant for EleonoraB.

  - No grant for MarioB (who will then go to HB2018 as already anticipated).

- Low-impedance collimators poster proposed was upgraded to contributed oral talk (to be given by NicoloB).

- HB2018 invitations

  - SergeyAnt => Will decline as he will participate already to IPAC18 and E-cloud workshop in Spring.

  - LottaM => With EPFL.

  - EiriniK => Was already in the list.

  - AdrianO => Was already in the list.

- XavierB prepared few slides on "Single bunch stability threshold 2015 – 2016 – 2017" (https://indico.cern.ch/event/703766/contributions/2887059/attachments/1606528/2549321/2018-02-26_qpp-latency.pdf) => To be discussed next week.

4) TMCI in the SPS Q22 studies (MarioB): https://indico.cern.ch/event/703766/contributions/2887055/attachments/1606519/2549245/HSCSM_MB_26022018_TMCI-in-Q22.pdf

- Conclusions

  - Usual scalings of the TMCI confirmed (as with Q26 andQ20 optics).

  - Still some work to confirm the tune shift measurements.

  - The TMCI intensity threshold is close to the LIU intensity: do we have enough margin?

- After the meeting, MarioB checked that the pickups for the MultiQ and BBQ are 2 different, but identical, stripline pickups. One should not confuse the MultiQ and the MultiT (which uses the BPMs).

5) Effect of chromaticity on the destabilising effect of the transverse damper (SergeyAnt): https://indico.cern.ch/event/703766/contributions/2887058/attachments/1606471/2549301/Effect_of_chromaticity_on_the_destabilizing_effect_of_the_transverse_damper.pdf

- Highest effect for a chromaticity, which is close to 0 but depends on the transverse damper. Furthermore, the width increases as the bunch intensity approaches the TMCI threshold. To be confirmed with DELPHI.

6) Transverse kick factors of HL-LHC crab cavities (SergeyAnt): https://indico.cern.ch/event/703766/contributions/2891510/attachments/1606521/2549295/Carb_cavity_kick_factors.pdf

- Topics brought by RiccardoDM as we have a lot of HOMs and they could kick the beam and lead to emittance growth. Could this be the case? By how much?

- There is no noise from the HOMs alone => Need to be excited by the beam, i.e. treat the HOMs as the other impedances.

- Single-bunch kick factors already computed in the past by NicoloB => Small. What about multi-bunch kick factors?

- GianniI raised the question about the bunch length to be used. Until now we have been using the rms value from a Gaussian distribution => To be reviewed in the future in case there are good arguments to use another function (such as the q-Gaussian).

- XavierB mentioned that in the formula from Lebedev, which computes the transverse emittance growth in the presence of noise, there is also a term from impedance. Action: check the formula and try and estimate the impedance term required to start to see some emittance blow-up.

7) Effect of collimator coating thickness on HL-LHC octupole thresholds (SergeyAnt): https://indico.cern.ch/event/703766/contributions/2891512/attachments/1606460/2549304/Update_on_Coating_thickness.pdf

- Confirmed past results and in particular that if the coating thickness is sufficiently thick (> ~ 3 microm), the bulk material is not important and could therefore be CFC.

- This is why we asked for 5 microm in the past and MoGr as bulk was proposed by collimation team and mentioned to be better (from impedance point of view) in case part of the coating is removed.

- These results will be discussed soon at some WP2 meeting.

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 (135th) meeting will take place on Monday 05/03/2018 (in room 6/R-012 at 10:30) => Current agenda:

    1) General info and follow-up (EliasM)

    2) Discussion on LHC MDs in 2018 (Everybody)

    3) Impedance effects of the HL-LHC coated inner triplets (SergeyAnt)

    4) Update of LHC BTFs (ClaudiaT)

    5) Is a thermal runaway a possible explanation for the different heat loads of the LHC sectors? (GianniI)

    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, 26/02/2018.