Minutes of the HSC section

103rd meeting on Monday 06/03/2017 (10:30, 6/R-012)

HSC members: Javier Barranco Garcia (JBG), Mario Stefan Beck (MSB), Eleonora Belli (EleoB), Olav Berrig (OB), Nicolo Biancacci (NB), Xavier Buffat (XB), Lee Robert Carver (LRC), Giovanni Iadarola (GI), Kevin Li (KL), Elias Metral (EM), Mauro Migliorati (MM), Adrian Oeftiger (AO), Tatiana Rijoff (TR), Annalisa Romano (AR), Giovanni Rumolo (GR), Benoit Salvant (BS), Michael Schenk (MS), Claudia Tambasco (CT), David Amorim (DA), Alistair Arnold (AA), Sondre Vik Furuseth (SVF), Philipp Dijkstal (PD), Giacomo Mazzacano (GM), Galina Skripka (GS), Antonio Gilardi (AG), Francesco Giordano (FG), Sergey Antipov (SA).


1) Newcomers / visitors

- Sergey Antipov on March 1st to work as HL-LHC fellow with NicoloB (on impedance and instabilities). Welcome!

2) Comments on the minutes of the previous 102nd meeting + Actions

- See last minutes-actions:


  - Destabilising effect of the resistive transverse damper => Next steps:

    - pyHEADTAIL simulations: Check first with pyHEADTAIL (KevinL) the required Landau octupole current to stabilize the instability without and with transverse damper vs. Q' (say between ~ -5 to ~ +5 units) for a bunch intensity range from ~ 2 times smaller than the TMCI intensity threshold without damper to ~ 2 times higher than the TMCI intensity threshold without damper => Any news?

      => Some results, which will be discussed the next time.

    - Solve the 2D dispersion integral, see last minutes.
- LHC heat load and difference between the sectors => PaoloC and CedricG informed of the outcome of our studies.

- Important studies to be finalized/documeneted before the start-up (LeeC et al.):
  
  - "Try and reconstruct the evolution of the tune shifts at injection from measurements in the past years (if still possible...)" => Would be great to have a short note summarising all the measurements from 2012 to 2016 and it would be important to have all documented before the start-up.

  - "...Further work is needed to understand when/why this instability appears." => We should aim to complete this analysis before the start-up, making or not by the way a proposition to move the TOTEM bump once in collision for instance (if we think of course that this is justified or better...). We could maybe warn OP also at some point (in fact we discussed it a bit already with Jorg) to have the possibility to move easily the TOTEM bump...

- BTF: Several BTF improvements have been discussed with BI for next MDs. The calibration is still under discussion => Can’t we estimate it? It depends on the configuration but from simulations we should be able to estimate it?

- Offices => What is the situation?

3) General infos and follow-up (EliaS)

- SLM:

  - Reminder for CERN cars: all cars have now a “spoon” (identifier) which is obtained via the group secretary => Please contact the group secretary to have it.

  - Reminder: OHS form to be filled in the MERIT.

- IEFC

  - Review of PS shielding => Seems RP is happy.

  - SPS TIDVG => Under bake-out at the moment.

- LMC and LHC:

  - LMC actions: send to GA a copy of what is sent to BenoitS.

  - ABP Actions update.

  - The new collimators test pieces are not within specs for outgassing, this creates problems for the foreseen tests of the 3 different coating possibilities. P.
Chiggiato suggested to increase pumping capability to solve this problem. It seems that the samples themselves barely made the specs and the brazing degraded further the situation. Brazing experience at CERN is fading away.

=> High-priority for the impedance team to prepare well these measurements.

- Evian proceedings: reminder to write up papers. A proposal for a full set of parameters for RUN2 should be compiled soon.

- Statement requested this Wednesday at the LMC about the doublets beam => From the e-cloud team as to whether there would be a scenario, in which the doublet beam would be needed during the scrubbing run. Giovanni answered that he does not see any scenario, in which the doublet beam would be needed during the scrubbing run.

- Outcome of MERIT interviews:

  - GiovanniR will step down as MD coordinator => HannesB will take over.
  
  - GianniI will replace GiovanniR as e-cloud leader (at least during LIU period).
  
  - NicoloB will take over as leader of the ABP/HSC impedance working group, to coordinate the studies aiming at a better understanding of the theoretical, simulation, bench-measurement and beam-measurement methods, which are used to develop the impedance models of particle accelerators.
  
  - XavierB will work more on instabilities in LHC and HL-LHC (i.e. even without beam-beam) as NicoloB will concentrate mainly on LEIR.

- For the team:

  o LHC and HL-LHC

    ▪ ATS this year: More linear machine => Could be worse for us.
    ▪ Heat load in the different sectors
    ▪ Q” to be ready for scrubbing run
    ▪ Adjust instabilities and TOTEM bump
    ▪ PACMAN effects
    ▪ HL-LHC OP scenario with crab cavities, etc.

  o LIU
- See review recently.
  
  - Better understanding of coherent instabilities in our machines
    
    - Instabilities in LEIR and PSB (higher priority)?
    - Effect of space charge
    - Effect of transverse damper
    - Effect of e-in quadrupoles
    - Dispersion integral to be solved in the presence of mode-coupling
    - Combined effects, etc.
    - Propose tools for OP => E.g. scripts to analyse instabilities rapidly, etc. (LeeC)

- Slides for LIU-SPS BD meeting => Work from DavidA about the SPS 200 MHz and its impact on the transverse coupled-bunch instability:
  
  - Next: simulations to be done for the 5 ns beam.

- Talks for the workshop in Karlsruhe: GiovanniR, Gianni and EliasM.

- SC workshop confirmed by FrankS at GSI on 04/10 to 06/10 => Possible HSC talks:
  
  - QPU: theory, simulations and measurements (AdrianO, MalteT and EliasM).
  - Effect of SC on the CERN instabilities: LHC, SPS, PS and PSB (AdrianO).

4) Benchmarks between DELPHI and recent TMCI studies (DavidA)

- 2 cases studied and compared to the previous results: short and long bunch => Good agreement with a factor 2 between the damping times. To be confirmed with pyHEADTAIL.

- Next:
  
  - Run DELPHI with uniform longitudinal distribution.
  
  - Compare to NHTVS.
  
  - Superimpose the 2 curves to have better comparison.
- Solve the general dispersion relation.

- See pyHEADTAIL simulations.

- Etc.

5) Update on HL-LHC WP2 actions (=) EliasM to report at the WP2 on 21/03/17)

- Plan discussed with relevant people.

6) Progress/status in the different activities/projects and reports from meetings:

- Impedance (BenoitS)

  - Imped WG on 17/02 and one coming in 2 weeks:

    - TDIS review outcome.

    - Hot topics: LIU wire scanner, which should replace the old one in PSB, PS and SPS. Very difficult to simulate and we don’t have real prototype to measure.

    - Beam pipe temperature meas. in CMS using fiber optics from the outside of the pipe => Meas. continuous temperature, which is nice but with vacuum outgassing it will be difficult to use.

    - CV discussed the braided shields. Now, we have RF fingers but the answer from Jaime was that it was looked in the past and the issue was vacuum.

    - MarioB made an update on the Y-chamber, with a possibility to solve the pb. but as they are being manufactured, it is a bit late and the effect on the beam should be small.

    - Another hot topics: Meas. of the PSB and PS RF bypasses as they take a lot of dose. Is it worth?

    - LHC BGI: was decided to be removed, all of them. Make some wire measurements.

    - Next WG: MauroM.

    - Talk from NB at the CollWG.
- Ecloud (Giovannis^2)
  - Ecloud meeting. No evolution of scrubbing for standalone dipoles whereas from the instrumented cells we could see sthing. But it is true that the aperture is different.
  - AnnalisaR mentioned that she is doing simulations with quads.
  - MuLcoPIM conference for the space community: 6-12 April. 5 sessions devoted to SEY measurements.

- Beam-beam (XavierB)
  - WitoldK confirmed that the measured pile-up during the high pile-up MD is close to what we said, i.e. ~ 160 => Great!

- Space charge (AdrianO)
  - Simulations running. HL-LHC studies started without space charge. 100kturns for 3 hours (8 times faster on lxplus).
  - Instabilities at flat-top.

- ABP-CWG (GiovanniR)
  - pyORBIT and SC tools by HannesB.
  - afs phase out will happen for sure. Will be replaced by EOS, which has a huge storing space and which is quick with big files (which are the 2 main pros) and not a working place. IT is now willing to go towards EOS.

- PyHEADTAIL (KevinL)
  - Meeting this Friday to prepare the new release.
  - Multi-bunch being tested.

- DELPHI (DavidA)
  - Ongoing studies of the destabilizing effect of the transverse damper.

- LIU (GiovanniR)
  - Nothing special to report.

- HL-LHC
  - TCC:
- Nothing special to report.

- WP2:

- Nothing special to report.

- FCC

- SergeyArsenyev announced a CERN workshop March 30th – 31st to discuss the impact of laser treatment on beam stability.

- Machines / MDs (past and future)

- Injectors MDs day on 23-24/03/17.

- LHC MD day on 31/03/17.

- Others?

  - AP forum by OlavB (and AndreaL) on symplectic tracking being scheduled.

7) Miscellaneous

- The next (104th) meeting will take place on Monday 27/03/2017 (in room 6/R-012 at 10:30)

=> Current agenda:

1) General info and follow-up (EliasM)

2) Study of the destabilising effect of the resistive transverse damper with DELPHI (DavidA)

3) Study of the destabilising effect of the resistive transverse damper with NHTVS (SergeyAntipov)

4) Study of the destabilising effect of the resistive transverse damper (and the required Landau octupoles current to reach stability) with pyHEADTAIL (KevinL)

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

6) AOB (everybody)
- Important events and dates for HSC: https://espace.cern.ch/be-dep-workspace/abp/HSC/SitePages/EventsAndDates.aspx.


Minutes by E. Metral, 27/03/2017.