Minutes of the HSC section

131th meeting on Monday 15/01/2018 (10:30, 6/R-012)

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

1) Xmas party + coffee

- Many thanks for the nice presents!

2) Newcomers / visitors

- None.

3) Comments on the minutes of the previous 130th meeting + Actions

- None.

4) General infos and follow-up (EliasM)

- SergeyAnt accepted the proposition to become scientific secretary of WP2.

- SLM:

  - Migration of the office telephones: it will start by the end of May 2018 in BE and will be finalised by mid-summer. The standard is a headset connected to a computer (MS Windows, IOS and LINUX) or smartphone with skype for business. The OP group will centralise the requests for the control rooms. Phones of students leaving the group should be redistributed to cover the needs of other students, control rooms or staff. The RF group volunteered to use the new phones as a pilot project. An ABP information meeting will be organised in due time.

    => This was the news at that time but things evolved meanwhile (see next meeting).

  - Information for MAC users: A CMF equivalent service will be made available for the update of software, like in MS windows.

- A Cloud licence office is being put in place for which cloud compliant servers will be checked and approved for storing work documents, data, etc. The cloud licence office can establish a contract for large storage, e.g. for an experiment.

- A CAS on “Basics of Accelerator Physics and Technology” will be organised on 25-29 June 2018, in Archamps, France.

- International SOS: Membership cards will be procured by AlessiaV.

- C++ and python versions will be updated in the technical network.

- PIMS-II study: an international facility is being discussed (Montenegro or India) and also a carbon treatment facility based on a linac. A kick-off meeting will take place in March. It would be important to get on board institutes like CNAO, MedAustron.

- The availability of CERN car keys is quite limited but also of parking space, as other CERN cars may be parked in the ABP dedicated spaces.

- Regarding the AFS phase-out on the technical network, RichardS is gathering the information.

- At the LMC, SimoneG reported on the strategy for the LHC dump, where nitrogen lines will be installed with gas bottles on the ground so that there is no need for access. AOB from Stefano on low impedance collimators installed for one year, the LMC accepted their presence in the tunnel also during 2018.

- Simulation of the high intensity beams with a beam from LINAC4 at the possibly reduced source current => Collaborative effort FanouriaA / EriniK / ABT.

- Effect of chromaticity on the destabilising effect of the transverse damper => Some new plots from SergeyAnt which will be presented in the near future.

- Discussions with FrankZ

  - At the HE-LHC design review ClaudiaT found that it is quite easy to stabilize the 13.5 TeV HE-LHC beam with Landau octupoles (https://indico.cern.ch/event/674475/contributions/2805123/attachments/1573607/2484500/HE_LHC_review_CT.pdf) => Are we sure? Can we say that there is no need for an e-lens? => To be discussed soon.

  - Review of the impedance from pumping slots: LHC, HL-LHC and FCC. What were the main changes? => To be discussed soon.

- Trainee (TitusStefanDascalu) could come and join us for 3 months this summer to work on FCC/HE-LHC with French-speaking people => DavidA et al. are interested.

- LSWG last week with talks from XavierB on LHC instabilities and postponed talk from BenoitS on 16L2 MD with solenoid off.

- Info from AdrianO: HTCondor crashed the majority (99.5%) of his jobs => Intensive work with IT and the helpdesk...

- Where are we with the MDs and notes/papers to be written?

- Follow-up by BenoitS et al. about the EM beam power spectrum for 8b4e to help CMS understanding an issue in their pixel detector => See https://indico.cern.ch/event/689096/contributions/2829430/attachments/1582359/2501270/Request_from_CMS.pdf

- No obvious reason why 8b4e would be much worse than BCMS in the 10 to 100 kHz range.

- Ongoing discussions to have a procedure to evaluate how much power can escape the beam pipe at a given frequency.

- Info from GiovanniR about the HPC cluster at CNAF: Finally the HPC cluster relocated from CNAF to Cineca is again up an running, although with fewer cores. We expect the missing cores to be replaced soon.

- LHC at ultimate energy (7.5 TeV) => Plot the required tune spread as we did for HL-LHC.

- EiriniK: She accepted to become the new Scientific Secretary of the PBC meeting from MikeL. It seems she will also be the Scientific Secretary of another PBC committee: Beam dump facility (or SHIP).

- NicoloB: TDIS meeting last week, as they propose to coat it. GalinaS is following this from e-cloud with the new coating. GiacomoM studied the impedance and he found that everything is fine.

5) General discussion about the 16L2 instabilities (Everybody):

- No news => Current understanding to be reported by DanieleM at Chamonix.

6) Present understanding of the LHC transverse single-bunch instability: both head-tail and TMCI regimes (DavidA, XavierB et al.): https://indico.cern.ch/event/689096/contributions/2829429/attachments/1582711/2501185/2018-01-15_HSC_TMCI_LHC_results_detailed.pdf

- DavidA reviewed all the TMCI measurements => Input for GianniI's talk at Chamonix.

- The collimators position change has a visible impact on the tune shift => A tune shift reduction is clearly visible with the HL- LHC equivalent impedance.

- Important question to answer in the future: Why do we observe an instability when we reduce the chromaticity from 15 to 5 in one go and we observe no issue when we reduce it in two steps: one from 15 to 10 and then another one from 10 to 5?

- Reminder: Vertical lines are the ADT kicks time stamps.

https://indico.cern.ch/event/689096/contributions/2829430/attachments/1582359/2501215/2018-01-15_TMCI-expanded.pdf

- XavierB reviewed the measurements of stabilizing Landau octupole currents made since 2015 and looked at possible explanations for the much larger (than predicted) current required for small chromaticities

    - Destabilising effect of the ADT? => Seems not as despite the mode coupling through the damper the one-mode stability diagram seems to remain valid.

    - Effect of the quadrupolar impedance? => Seems not as a very small impact was observed.

    => Other explanations remain to be found…

7) Status of multi-bunch pyHEADTAIL: development and simulations (KevinL): https://indico.cern.ch/event/689096/contributions/2832178/attachments/1582708/2501177/03_PyHEADTAIL-MB.pdf

- Motivations

    - Transverse feedback studies for the FCC-hh => Coupled bunch instabilities, injection oscillations, etc.

    - Realistic models for a beam and a transverse feedback system => PyHEADTAIL

        - New feedback module

        - Multibunch PyHEADTAIL

    - For LHC, simulate ~ 3000 bunches and for HL-LHC simulate ~ 13000 bunches.

- The communication all together is done only once per turn.

- Note that the // strategy for e- will be different as the broadcast does not work as it also does not work for beam-beam.

- With a slight change of perspective/reference frame, significant speed- ups can be obtained

Change of perspective. Freeze coordinate system as given by ring geometry. Slicing determined entirely by ring geometry.

- The performance seems now sufficient; some benchmarking was already done (to be finalized), but the multibunch version is still a development branch and the merging still needs some work.

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 (132th) meeting will take place on Monday 05/02/2018 (in room 6/R-012 at 10:30) => Current agenda:

  1) Beam loading vs. instability in plasma accelerators (Sergei Nagaitsev from FNAL)

  2) General info and follow-up (EliasM)

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

  4) Review of slots impedance studies for LHC, HL-LHC and FCC: history and current status (NicoloB)

  5) Update of the PS instability at transition (EiriniK, tbc)

  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, 04/02/2018.