Minutes of the HSC section

62th meeting on Monday 09/11/2015 (14:00, 6/R-012)

HSC members: Olav Berrig (OB), Christian Carli (CC), Elias Metral (EM), Giovanni Rumolo (GR), Frank Schmidt (FS), Elena Wildner (EW), Elena Benedetto (EB), Michael Bodendorfer (MB), Kevin Li (KL), Tatiana Pieloni (TP), Benoit Salvant (BS), Guido Sterbini (GS), Daria Astapovych (DA), Nicolo Biancacci (NB), Alexander Huschauer (AH), Giovanni Iadarola (GI), Adrian Oeftiger (AO), Tatiana Rijoff (TR), Letizia Ventura (LV), Claudia Tambasco (CT), Magdalena Kowalska (MK), Andrea Passarelli (AP), Annalisa Romano (AR), Michael Schenk (MS), Vincenzo Forte (VF), Javier Barranco (JB), Aaron Paul Axford (APA), Malte Titze (MT), Francesco Paciolla (FP), Mario Stefan Beck (MSB), Stefan Hegglin (SH), Alpo Valimaa (AV), Hannes Bartosik (HB), Lee Robert Carver (LRC).


1) Newcomers / visitors

- None.

2) Comments on the minutes of the previous 61th meeting + Actions

- No comment.

3) General infos

- This is the CAS week => Many very nice lectures! Have a look…

- SL meeting:

  - By November 19th the abstract for IPAC16 should be uploaded. SLs have until Wednesday 23rd to approve them and the GL will look at them.

  - By the end of November all SLs should send to Anais/Elodie all the travel wishes for 2016 => Could you please send me all your travel wishes for 2016 by Friday 27/11/15?

  - Everybody will be given a special key for activating the car pool GPS and track where the car is driven, make sure about expiry date, in the future an information
should be sent if the key is about to expire.

- We are reminded that opening of false floors during operation of the accelerators (also just to take a look) needs the former approval of the FOM.

- LMC

  - Plans for ions were presented. Scheduling is already difficult.

  - The level of heat load due to impedance and synchrotron radiation as expected from calculation should be displayed in all plots of heat load.

- IEFC:

  - The electric optical pick up in the SPS were discussed. The impedance team has not yet made a statement.

  - Enamel flanges were discussed and their effects in terms of impedance should still be evaluated.

- Action for us on online tools => We could include in the CCC displays the heat loads and synchronous phase shifts we have/expect as a function of number of bunches, bunch population and bunch length, from:

  - Impedance,

  - Synchrotron radiation.

- Ji Qiang => I sent you an email. Please tell me in case of interest.

4) Brief performance reports for the different machines

- PSB (MagdaK and OlavB and AdrianO)

  - Pictures of the week: 1, 2, 3, 4. Pictures 1 and 2 => The positive x-axis of the LT/LTB/BI lines is pointing in the opposite way of all the other lines and accelerators in CERN. This gives an opposite sign of the dispersion (this comes from a convention that we might want to change or not => to be followed up). Picture 3 shows the distributions we have in the PS now using hollow bunches from the PSB, first wire scans on the flat-bottom during the last week indicate much less blow-up than compared to Gaussian longitudinal distributions. In the PSB there are some kind of reproducible instabilities, possibly related to longitudinal space charge (see picture 4). We're investigating how this effect comes about. It does not influence the final results though.

  - We’re in almost at the end of this year’s run, with a lot of MDs and tests. The PSB
was running very smoothly last week. All operational beams were delivered as requested. All beams for LHC MDs were also delivered as requested: nominal LHC 25ns, LHC INDIV & PROBE, LHC BCMS and LHC 50ns with large emittance.

160 MeV flat cycle beam for the BTMS (beam trajectory measurement system) MD has been prepared. The MDs have already started and are planned for (incoming) week 46.

Low intensity horizontal emittance MTE version has been prepared. The intensity of the new beam is 500e10 (versus 1600e10) with horizontal emittance of 2 microns (vs 5-6 mm mrad before) in horizontal plane and vertical emittance of 1 micron (vs 3.5 mm mrad before).

- PS (GuidoS)

- Picture of the week:
  https://www.evernote.com/l/AD2ibijSd5RKQqUSjVqaBpQsnPSTAuUyRfS.

- All operational beams were delivered as requested. All beams for LHC MDs were also delivered as requested, i.e, nominal LHC25ns, INDIV & PROBE together with 48 and 12 bunch BCMS and LHC50ns 36 bunch with large emittance.

Since Monday the SMH16 shadowing is in operation and the MTE beam has achieved CT performance for some periods though this beam remains instable from time to time (under investigation).

- SPS

- The week started with the UA9 run from Monday to Tuesday morning. Stable UA9 operation could only be established Monday evening due to LHC filling and initial issues with the new coastable cycle. This new cycle includes the extraction devices in LSS2 to allow for a crystal enhanced slow extraction test at a later stage. The DC operation of the extraction devices was successfully demonstrated (at least for a short time).

The dedicated MD on Tuesday was shortened due to an access required in LSS4 from 9:00 to 12:00 to investigate a vacuum leak in TT40 at the exit from the SPS at QDA419. A weld on the extracted beam vacuum chamber that passes through the coil of QDA419 had started leaking. It was temporarily fixed with varnish and will be repaired before the COLDEX run in the coming week.

In the afternoon of the same day the commissioning of the fixed target and LHC nominal ion cycles continued in dedicated MD.

A significant amount of downtime was accumulated over the week. Almost 6h downtime for the North Area physics were caused by a power supply problem of the MST extraction septum in LSS2 when switching from MD back to physics. The PS main power supply problem at the same time was in the shadow of the MST
issue. Another three hours were lost due to a problem with the PSB distributor this week and 4 h this weekend because of a COLDEX vacuum interlock (not fully understood yet). Various other problems occurred and caused in total another 6 h of downtime: water cooling problem in BA81, timing system problem Wednesday night, power supply problem on MDSH2106 and injection kicker anode heater issue.

The SPS prepared various flavors of LHC beams for the LHC MDs from Wednesday. During an MD with BCMS 25 ns beams a wrong manipulation by the SPS crew to solve a re-phasing problem caused 12 bunches to be injected into the LHC asynchronously and hence onto the TDI in point 2. The problem is fully understood and will be covered in the interlock system in the future. TI 2 could not be run from early Saturday morning to about 7 o'clock in the evening due to a problem of the Warm magnet Interlock System and most probably its repeaters. Another access will be required to fully understand the issue.

Logging data has shown that the QF glitches also occur on LHC cycles and not only fixed target cycles.

- LHC and HL-LHC (EliasM)


- LEIR (AlexH)

  Since mid-September an exponential increase of the vacuum pressure in the extraction region is observed, which clearly effects beam life time. Currently, the pressure level is about 100 times higher than usual values (1E-12 - 1E-11). Apparently, this effect is correlated to losses occurring at injection as the EARLY beam works well and the pressure rise is only visible for multiple injections.

  An investigation by the vacuum experts revealed a strong desorption of CO, which indicates that the beam is hitting some element in the extraction region (also consistent with observations from the past as mentioned by Christian). Most probable is an interaction between the ions and some stainless steel component.

  Furthermore, studies to improve the matching of the transfer line were continued. As YASP is not deployed for this line, steering is rather laborious and has to be done using the available SEM grids and BTV screens. This requires multiple cycles to carry out the measurements, as especially a measurement with the screens is destructive.

  In order to better understand the effect of the fringe fields of sector bends in the ITE loop, which causes important vertical defocusing, a kick response measurement was started.

  In parallel, A. Blas and S. Albright are studying the RF capture and R. Alemany is advancing on improving the generation of cycles.
S. Albright and D. Quartullo just started simulations of the RF capture with the BLOND code.


- YannisP reviewed all the ongoing and planned activities within the beam-beam team.

- A new fellow should join the team soon (coming committee).

6) Simulation of instability at transition energy with a new impedance model for CERN PS (Na Wang): [https://espace.cern.ch/be-dep/ABP/HSC/Meetings/InstabilitystudieswithTOFbeam.pptx](https://espace.cern.ch/be-dep/ABP/HSC/Meetings/InstabilitystudieswithTOFbeam.pptx)

- The fast vertical instability at 700MHz near transition is reproduced by measurement with TOF beam. The instability growth rate and threshold intensity are measured for different longitudinal emittance.

Simulation studies based on the new PS impedance model shows considerably good agreement with the measurements. Kickers are proved to be the dominant contribution to the instability.

Simulations show that we can benefit 10% of growth rate by removing BFA kickers (BFA09S, BFA21P, BFA21S) and about 20% by removing KFA04, KFA13 and KFA21.

Further studies with gamma transition jump and chromaticity jump are on going…

7) 1st discussion on possible LHC parameters for 2016 (all people involved)

- LeeC: [https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Prep_Slides.pptx](https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Prep_Slides.pptx).

- GianniI: [https://espace.cern.ch/be-dep/ABP/HSC/Meetings/002_ecloud_considerations.pptx](https://espace.cern.ch/be-dep/ABP/HSC/Meetings/002_ecloud_considerations.pptx).

- KevinL: [https://espace.cern.ch/be-dep/ABP/HSC/Meetings/HSC_slides.pptx](https://espace.cern.ch/be-dep/ABP/HSC/Meetings/HSC_slides.pptx).


=> We will discuss on Wednesday with Gianluigi and other teams from ABP to prepare Evian15, Chamonix16 and propose some machine and beam parameters for 2016.
8) AOB: any other important/interesting information from the different projects/studies (LIU, HL-LHC, ELENA and FCC) and from the different working groups (SC, EC, BB, IMP and HDWG)

- LIU, HL-LHC, ELENA, FCC, SC, EC and HDWG: nothing special to mention.

- IMP

  - Requête eventuelle de rajouter une cavité près du TCL4 pour le 5ème axe en contradiction avec notre requête pour l’ECR de plus tot cette année.

  - Travail sur le nouveau TDI, et étude des nouveaux designs.

  - Measurements on the 2nd TDI: Should have it ready for the impedance measurements to start on the 25. Then you’ll have 26 and 27. Monday 30 we should be able to close it and hand it over to vacuum team.

  - Requête sur l’étude de l’importance des enamel flanges au SPS.

  - Summarize and harmonize all heat load contributions to beam screen and prepare a fixed display for the CCC.

9) Actions to be taken for the next meeting

- List of all actions: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/Actions.aspx.

10) Miscellaneous

- The next (63th) meeting will take place on 16/11/2015 => Agenda:

  1) General info and follow-up (EliasM)

  2) Performance reports for the different machines (PSB, PS, SPS, LHC and LEIR) => With ideally a picture of the week!

  3) Status of the RFQ studies and proposed strategies for the near future (MichaelS)

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

- Preliminary agendas for the next meetings: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/MinutesOfMeetings.aspx.


Minutes by E. Metral, 10/11/2015.