# Meeting of LIU SPS-BD WG on 23.10.2018

Present

Participants:

Elena Shaposhnikova, Hannes Bartosik, Wolfgang Hofle, Ivan Karpov, Jani Komppula, Christine Vollinger, Giulia Papotti, Heiko Damerau, Alexandre Lasheen, Helga Timko, Fritz Caspers, Markus Schwarz

Agenda

1. MDs on longitudinal instabilities in the SPS – M. Schwarz
2. Recent reference measurements with long bunches – G. Papotti
3. Stabilising 4 x 12 x 2e11 ppb – G. Papotti
4. Measurements of horizontal instability – H. Bartosik
5. Possible quality control of the VF impedance shielding – C. Vollinger

Actions

* pending
* **N. Nasresfahani**: Study the possibility to use the new coupler design to replace all existing 630 MHz HOM couplers.
* **M. Schwarz**: Include the momentum acceptance limitation in simulations.
* **M. Schwarz**: Is it possible to understand if the instability observed with the radial-loop is real or only related to numerical problems?
* For the slip-stacking cycle, determined the aperture needed for the collimation system.
* A list of the key moments in the various cycles (slip-stacking!) is necessary to adjust the design of the collimation system.
* Measurements of the beta beating to include optics errors in simulation of the collimation system.
* Check the impedance of the new collimation system.
* **M. Schwarz**: Quadrupole oscillations are observed at flat bottom with the feedforward activated. Study where this is coming from.
* **A. Farricker**: Check with C. Zannini for the discrepancy in MKEs impedance.
* **A. Farricker**: Provide an updated longitudinal SPS impedance model for the present and future cases.
* **D. Quartullo**: Check the loss of Landau damping in Q26 for the ion cycle (are the oscillations more violent than in Q20?).
* Calculate the maximum voltage in the 800 MHz RF system due to power limitations and beam-loading.
* Ask the feedback team if it is possible to program a separated voltage program for a slip-stacking MD.
* **C.** **Vollinger:** Check how many cross section step-like changes are in the SPS
* **A. Farricker:** measurement of synchronous phase
* New

**1 –** **MDs on longitudinal instabilities in the SPS – M. Schwarz**

* Simulation by Joel predict that 800 MHz cavity does not help to cure the flat bottom instability when the Feedback is off
	+ **E. Shaposhnikova:** It is important to point out that this is valid when the feedback is off.
* Measurements confirm this, when considering the average bunch length
* On a bunch-by-bunch basis, the 800 cures instability for first bunches in the batch

**2 – Recent reference measurements with long bunches – G. Papotti**

* Measurement of bunch profiles of long (~30ns) bunches with RF off, to obtain ‘fingerprint’ of impedance sources.
* First occurrence of 1.4GHz frequency component, then prominent 200 MHz component.
* Agreement with previous (2013) measurements for Q20, but Q26 threshold may be different
	+ **E. Shaposhnikova:** When you chose reference frequencies for the final plot, you need to keep in mind that 1.4GHz impedance source will be greatly reduced after LS2.

**3 – Stabilising 4 x 12 x 2e11 ppb – G. Papotti**

* Preparing to extract 4x12 bunches with 2e11 ppb for LHC heat load MD
* Steps taken to achieve stability:
	+ FB on; FF off during flat bottom, turning FF on at end of flat bottom
	+ Longitudinal damper on
	+ Injection into 5.5 MV (instead of 4.5 MV)
	+ Optimized 800 MHz program during ramp
* Next steps for Run 3: optimize also phase of 800 MHz cavity and blow-up with intensity effects taken into account

**4 – Measurements of horizontal instability – H. Bartosik**

* With use of new octupole settings (-0.2KLOF) beam could be stabilized
* Flat bottom losses are enhanced when FeedForward system is on
* Instability occurs with batch spacing of 200ns and disappears with a batch spacing of 1000 ns and higher intensity.
* With injection kicker delay optimized, better transmission of last batches is achieved.

**5 – Possible quality control of the VF impedance shielding – C. Vollinger**

* During LS2, interconnects in 108 SSSs adjacent to QF magnets and some interconnections upstream and down stream of these SSSs will be RF-shielded
* QA is done by BE-RF and installation of shields requires good coordination of all teams involved (TE-MSC, BE-BI, TE-VSC, BE-RF,…)
* Some shields installed in situ, others on the surface; with full shielding only after all parts are re-installed -> measuring shielding effects is time critical in work planning

Next meeting 20 November.

Minutes written by M. Schwarz