# Meeting of LIU SPS-BD WG on 25.08.2016

Present

H. Bartosik, T. Kaltenbacher, T. Roggen, E. Shaposhnikova, P. Kramer, J. Repond, A. Lasheen, J.F. Esteban Müller, R. Calaga, J. Perez Espinosa, H. Damerau.

Agenda

1. Update on the SPS impedance model – T. Kaltenbacher
2. HOMs in the 200 MHz RF system – P. Kramer
3. Studies of LHC beam losses at PS/SPS transfer , update – H. Bartosik
4. **– Update on the SPS impedance model – T. Kaltenbacher**

Update on the vacuum valves (VVSB) and other types of elements which are not included yet in the impedance model. The SPS impedance model is incomplete and new sources are still investigated.

* 33 VVSB currently in the ring but none of them are included in the impedance model.
* VVSB impedance spectrum similar to the VVSA shifted in frequency.
* Two non-negligible resonances located at 1.8 and 2.4 GHz.
  + Assessment of their impact on the beam dynamic required (🡪 Joël).
* Other elements not included in the model presented.
  + Transverse Schottky PUs.
    - 1 vertical, 1 horizontal.
    - The pillbox cavity approximation shows already a non-negligible impedance.
    - Simulations ongoing.
    - The decision should be taken to use them or to remove them from the ring.
  + Long list of RF pickups.
    - Designed by RF people, impact in terms of impedance should be small.
  + Total number of isolated vacuum flanges still not known 🡪 should be assessed.
  + Pumping modules are installed around all kickers.
  + There are two beam dumps to be evaluated as well.

1. **– HOMs in the 200MHz RF system – P. Kramer**

Update on the HOMs spectrum in the 200 MHz TWC. The decision about a complete redesign or just the improvement of the existing **couplers** and their total number must be **taken before the end of 2016**. To study the impact on the beam dynamic and thus assess the options we have, we need a reliable model of the high order modes.

* Good agreement between simulations and measurements for R/Q in 1 section apart from the 550 MHz resonance (present in Jose model, 4 sections, too) 🡪 study needed.
* Existing damping around 630 MHz is already important, another factor two is going to be difficult to achieve.
* In beam dynamic simulations the 912 MHz resonance (with 400 kOhm) seems to stabilize the beam.
  + Need to be investigated (Joël).
  + Simulations at FT, the behavior during ramp can change the picture.
* To do: simulations of the 3 sections to obtain HOMs because in the model the HOMs are just scaled down from 4 and 5 sections (🡪 Patrick).
* Rama
  + In the tunnel measurements the 912 MHz resonance was not there, small resonances around 910MHz.
  + CST simulations not accurate in frequency, even worst at high frequency (can be off by 10MHz) 🡪 Simulate the effect of moving slightly the resonator (Joël).

1. **– Studies of LHC beam losses at PS/SPS transfer - update – H. Bartosik**

Recent studies of the LHC beam losses on the injection plateau have shown that they come mainly from longitudinal mechanisms.

* Incoherent losses at FB and loss of circulating un-captured beams:
  + Mechanism of faster losses with 800 MHz on?
  + Behavior at higher intensity?
* Scan of emittance with half intensity. For half emittance 🡪 only 1 percent of losses, maybe another mechanism involved.
  + Confirm longitudinal problems even with low intensity.
* **With both 40 MHz** cavities for PS bunch rotation 🡪 **decrease of total losses by 2%.**
  + 2% reduction already important for radio-protection issues.
  + Smoother ramp should help to keep inside particles on the edge of the SPS bucket.
  + Regarding the 80 MHz: conclusions from measurement post LS1 🡪 no improvement using 3 cavities (2 actually).
  + System fragile for the moment, cannot stay on for a long time.
  + Consolidation planned.
* The stable phase shift: how much do we expect from e-cloud effect and longitudinal effects?
  + Simulations needed from both sides.
  + Simulations of uncaptured beam are problematic (whole ring).
  + Single bunch simulations (Helga) does not show an important shift.

Minutes written by J. Repond