**SPSU-BD WG meeting on 12 May 2011**

**Present:** Gianluigi Arduini, Theodoros Argyropoulos, Hannes Bartosik, Nicolo Biancacci, Chandra Bhat, Thomas Bohl, Fritz Caspers, Juan Esteban Muller, Brennan Goddard, Wolfgang Hofle, Elias Métral, Nicolas Mounet, Yannis Papaphilippou, Giovanni Rumolo, Benoit Salvant, Elena Shaposhnikova, Vittorio Vaccaro, Cristina Yin Vallgren.

**Update on impedance of enamel flanges in SPS by Benoit Salvant**

Flanges on both sides of each BPM are coated by a small layer of isolating material. The impedance of these enamel flanges is a concern due to the PS experience. The geometry is not trivial and small layers are hard to simulate with 3D codes. From CST simulations, the flange acts as a charging and discharging capacitance.

From these simulations small transverse single bunch effects are expected (as bunch length is small). Longitudinal effects and resonances at ~200 MHz will have to be followed up.

These simulations should now be crosschecked with the theory on resistive inserts by Shobuda as well as ABCI simulations.

Discussions:

Some past studies were mentioned ([work on the PSB](http://accelconf.web.cern.ch/accelconf/e00/PAPERS/TUP6B06.pdf) by Michel Chanel and Christian Carli et al, [wire measurements for the Booster and PS](http://cdsweb.cern.ch/record/960437/files/cer-002626722.pdf) by J. Bento, RF bypass by R. Cappi in 1989).

Fritz insisted on the EMI issues caused by these enamel flanges.

Gianluigi mentioned that these flanges were originally installed for the operation of the pickups.

**Actions:**

1. Assess impact on beam dynamics (ESME/HEADTAIL simulations), crosscheck with theory and ABC (Benoit).
2. Compare with the PS case (Benoit)
3. Impedance measurements in-situ (Fritz)

**Nicolas Mounet: Effect of the working point on the resistive wall multibunch instabilities in the SPS**

Using Sacherer’s formula, a decrease of a factor 2 in growth rate can be explained by the change of tunes from 1999 (26.52/26.68) to today.

Nicolas pointed out that the 100 MOhm/m obtained by Wolfgang is not the effective impedance.

**Elena Shaposhnikova: Short and preliminary summary of MD w19**

LHC25 with nominal intensity, very low emittance (2.5 microns?), low losses (<5%) was obtained. The number of batches was limited by the MKE heating. Possible reasons for low emittance measurements were discussed.

Despite the absence of scrubbing this year, the LHC50 beam was obtained with 1.6e11p/b on flat top. However beam was unstable longitudinally at the end of the ramp (no time for controlled longitudinal emittance blow-up optimization). PS-SPS beam transfer studies were conducted with this beam in collaboration with Heiko D.

Discussion:

Gianluigi asked whether a gate was used for the emittance measurements. After the meeting, it was checked with Ana Guerrero that gating was on and most probably have been measuring the first 900 ns of the batch only (beware that the logged gate length is in ns and not in 25 ns slots despite the units displayed in Timber).

Emittance measurements at both injection and extraction were performed with the IN scan.

**Giovanni Rumolo: Preliminary results and ideas for the SPS upgrade MDs on LHC beams in 2011**

 Giovanni reported very low losses with 4 batches on LH25 (3 to 4%). The emittance measurements showed repeatable inconsistencies between PSB, PS and SPS. The SPS wire scanner was calibrated by Stephane and Ana and its value could be trusted but the gating may hide emittance blow up. Electron cloud measurements showed again the clear difference between stainless steel and Amorphous carbon, in particular with the half coated chamber. They also showed the clearing effect of the clearing electrode.

Two limitations during the MD: spike in ZS and more importantly the MKE temperature interlock.

The LHC50 double batch (intensity higher than nominal) was accelerated with 3% losses and very small emittance growth on the gated bunches. E-cloud measurements also showed no signal for the aC liner and a clear signal for the StSt. Intensities close to ultimate showed more e-cloud signal (different from simulations), but still small emittances were measured on the gated bunches.

The LHC50 SB (PS Single Batch injection) beam above nominal intensity (1.4e11/b) was accelerated with 3 micron emittances and 3% losses.

Discussion:

Gianluigi advised to check if the ecloud monitor signal is off centered with the CNGS beam.

Possible reason for the 2 stripes may be that the electron distribution leads to the highest SEY at this location. An idea is then to do a bump to scan the surface.

**Juan E. Muller: SPS MD W19. Observations**

Juan showed slides with preliminary analysis of the PS-SPS beam transfer studies. The LHC 50 beam was becoming unstable with non optimized longitudinal blow-up in the SPS. Change in beam losses and stability was observed while having 2 or 3 PS cavities and changing the gain of the phase loop or the emittance blow-up in the PS and SPS.

**Hannes Bartosik: Preliminary results of the MD on transverse emittances for high intensity in the SPS low gamma transition optics**

The goal of the MD was to scan the injected intensity into the SPS and to measure the transverse emittance after acceleration using the nominal LHC cycle with a long flat bottom and a nominal ramp. The scan was only done with the Q20 optics.

Unfortunately, there are problems for emittance measurements in the PS and TT2/TT10 with this kind of beam, which makes it very hard to know where blow up occurs.

Transverse emittances show “linear” increase of emittance with intensity above 1.5e11p/b. Significant losses (>5%) occur above 2.4-2.5e11ppb. Longitudinal instability at flat top was observed above 2.5e11ppb .

Actions:

The recurring problems of emittance measurement in the PS have to be worked on together with BI colleagues

Check transmission on flat bottom and flat top.

 Perform simultaneous measurements of the injected longitudinal emittance (need to be constant!)

Perform a similar scan with the Q26 optics.