**Meeting of LIU SPS-BD WG on 02/08/2012**

**Present:** Theodoros Argyropoulos, Hannes Bartosik, Fritz Caspers, Chandra Bhat, Thomas Bohl, Alexey Burov, Silke Federmann, Wolfgang Höfle, Giovanni Iadarola, Giovanni Rumolo, Benoit Salvant, Elena Shaposhnikova, Helga Timkó, Carlo Zannini;

**Presentations:**

**Carlo: MKE heating with and without serigraphy**

The heating of the non-serigraphed MKE kicker was measured in machine studies and the power loss was calculated with the model structure. The simulations reproduce the clear reduction of the power loss and corresponding reduction of heating due to the serigraphy. The heating of the kickers in the simulations agree with machine observations within a factor two, where the simulations overestimate the heating. This could be partly explained by the fact that the water-cooling circuit of the kickers is not taken into account in the simulations.

*The peak in the longitudinal impedance at low frequency, which is introduced by the serigraphy, is expected not to be relevant for beam dynamics.*

*The discrepancy between measured and simulated kicker heating might be due to the bunch length used in the simulations, which differs from the typical values in the machine. In particular, the assumed bunch length is probably too short, since the typical bunch length on flat bottom for the 50ns beam is between 2.7 and 2.8ns. A reference for the evolution of the bunch length along the cycle would be generally useful also for other purposes …*

*Varying the bunch distribution does not change the power loss significantly, even when truncating the tails of the longitudinal distribution at two sigma. Nevertheless using the spectrum of the measured bunch profiles could refine the simulations.*

**Thomas: Beam quality of 50ns LHC beam in the SPS - MD of 2012-06-25 and operational experience**

The MD studies showed that the beam stability and beam quality at SPS flat top for the operational beam can be improved significantly by removing the RF-voltage dips at injection. However, this will reduce the transmission by about 1%. Furthermore it was observed that the injected bunch train is more uniform when increasing the blow-up in the PS, since the beam becomes more stable.

*The beam conditions during the MD were better than in operation.*

*The controlled longitudinal blow-up works better if the spread of bunch parameters at the moment when the blow up starts is small.*

*When increasing longitudinal blow-up in the PS the maximal bunch length at injection was almost unchanged, while only minima and mean values are increased.*

**Theodoros: First results of floating MD week 30**

The findings of the longitudinal stability of the 50ns beam with the Q20 optics were discussed. The bunch length at extraction was as expected from similar measurements last year, however the stability at high energy was not as good. During the MD the settings could not be improved even when using the same settings as last year.

*One of differences between this year and last years’ settings could be related to the feed-forward. It might be worth to spend one MD session on the optimization of the low-level RF settings.*

*The huge advantage of Q20 comes from the increase of the instability threshold at flat bottom, where right now we see problems in Q26 due to instabilities. These can presently only mitigated by larger longitudinal emittance from the PS or playing with the voltage dips at injection.*

**Helga: Update on PS-SPS transmission studies**

It was shown that adjusting purely the 80MHz cavity for reducing the bunch length at PS extraction is not sufficient for improving the transmission. On the other hand using two 40 MHz and two 80 MHz cavities with optimized timings allows for better transmission, or for significantly larger longitudinal emittance in the PS with similar transmission as with the present operational settings.

*Due to hardware limitations only one additional cavity can be switched on and used for these studies.*

*These studies can be very useful to increase the blow-up in the PS and thus allow for higher intensity with stable beam conditions. This might also be very interesting when operating with the Q20 optics in the SPS, if the LHC asks for higher intensity in the future.*

*The fact that the optimal voltage on the flat bottom in Q20 is not scaled with the Q26 values hints towards beam loading effects, which in relative terms are less severe in the Q20 optics due to the higher overall voltage needed.*

**Hannes: Summary of beam observations with 25ns beam**

As observed during the scrubbing run and in several MD studies in 2012, the 25ns LHC beam in the Q26 optics with nominal intensity (around 1.2x1011p/b) is presently not suffering from electron cloud effects. In particular, the transverse emittance is preserved on a 20s flat bottom.

*Further studies should be performed with higher intensity (up to ultimate, i.e. 1.7x1011p/b) in order to address the question if the coating of the MBB magnets with amorphous carbon will be needed for suppressing electron cloud effects in the future.*

*Similar studies of beam stability and beam quality should be repeated for the Q20 optics for direct comparison.*

*It is of great importance to minimize the venting of the SPS during the LS1, in order to preserve as good as possible the conditioning of the vacuum chambers and thus reduce the time needed for scrubbing after the start-up.*

Minutes written by Hannes Bartosik