

Minutes of the 31th meeting of the SPS Upgrade Study Team on 27 October 2009

Present: J. Bauche, S. Calatroni, F. Caspers, S. Federmann, R. Garoby, E. Mahner, E. Metral, E. Shaposhnikova, M. Taborelli, C. Yin Vallgren

Excused: G. Arduini, G. Rumolo, F. Zimmermann

- **Summary of AEC'09 workshop - M. Taborelli**

We had 41 registered participants, 22 from CERN.

A summary of some talks, mainly by workshop participants from outside CERN, was presented. All talks are at <http://indico.cern.ch/conferenceDisplay.py?confId=62873>.

There are good results obtained with the TiN coating for the conditioning with photons (PEP-II, KEKB, CESR-TA). The minimum δ_{max} measured is 1.2. After strong conditioning in the lab (e-beam) $\delta_{max} = 0.9$ was obtained, similar to many other materials.

DLC (diamond-like carbon) is an industrial alternative to the amorphous carbon with a $\delta_{max} = 1.1$ if sputter cleaned (S. Kato). However no ageing studies are available and the coating process seems to be quite complicated (two additional, adhesion and stress releasing, layers).

Conditioning of the uncoated metals by electrons (with final SEY close to 1) should be the same in the lab and in the machine (for the same dose) and it is probably connected with a surface graphitization. It is not clear if carbon is coming from the residual gas or the material itself.

Rough surfaces give very promising results with respect to low SEY, but generally they would need baking to reduce outgassing. A coating with very low SEY (below 0.5 at energies below 1 keV) was produced in the Spanish lab (I. Montero), but so far it is fragile and with potentially high impedance (Al particles).

Magnetic roughness is an interesting option for field-free (how much free?) regions.

As follows from simulations (G. Rumolo) done for coatings, the effect of grooves will also be significantly reduced if they are installed on one side only.

- **Preparation of microwave transmission e-cloud measurements in the CPS - S. Federmann et al.**

The PS set-up has interesting possibilities. Microwave transmission measurements can be done with and without e-cloud due to the presence of the StSt clearing electrodes and can be directly compared with the signal from the button pick-up installed in the middle of the experimental set-up. Contrary to the SPS no IM was observed so far, this is attributed to the absence of the electronics in the tunnel, good cable shielding, HP filter and 10 times higher (than in the SPS) revolution frequency.

It will not be possible to see the difference in transmission for forward and backward waves due to the use of the trapped (resonant) mode around 3 GHz (above beam coherent spectrum).

The first measurements with 25 ns spaced LHC beam are planned in week 45.

- **AOB**

(1) a-C coated RF shields were installed between the coated magnets.

(2) Inspection of different liners coming from the SPS ECMs shows that the first carbon coated liner installed in the SPS (in 2008) has 3 large uncoated circles; e-cloud trace is visible on the StSt liner and not on the next a-C one.

(3) The effect of fast conditioning at low B-field observed with ECM in the MD week 33 was analysed and will be presented at the next meeting (C. Yin Vallgren)

(4) Magnetic field between MBBs - J. Bauche will look for the possibility of performing preliminary (rough) measurements ourselves on spare magnets

(5) E. Metral gave a short update on studies by the impedance team (website <http://sps-impedance.web.cern.ch/sps-impedance/>) which include calculation of dipolar and quadrupolar kicker impedance as well as the effect of the resistive wall impedance on the head-tail (or TMCI) instability. Despite the much more accurate impedance model developed by the team, around 35% of the SPS transverse impedance is still missing. A full review will be given at the SPSU meeting in January 2010.

- **Next SPS MD in week 45**

Our MD is scheduled for Tuesday 3rd November (9:00-21:00). We will start with 25 ns spaced beam and then will have 50 ns and 75 ns spaced bunches. The effect of the coated inter-magnet region could be visible in pressure measurements. Microwave transmission measurements should confirm the good results from the MD in week 38 in the SPS. Measurements in the PS can be done on Monday, in preparation to the dedicated MD in the SPS, and continue on Tuesday, if needed. Only one available Frequency Analyzer needs to be transported from the PS to BA5.

- The next meeting will be on **17th November 2009** at 15:30.

Preliminary agenda:

Transverse FB for single bunch instabilities (20') - W. Hofle

Results from the SPS MD week 45:

- ECM, pressure (20') - M. Taborelli

- mw measurements (20') - F. Caspers

Elena Shaposhnikova, 28.10.2009