Minutes of the 6th meeting of the SPS Upgrade Study Team on 21 August 2007

Present: G. Arduini, M. Benedikt, S. Calatroni, F. Caspers, K. Cornelis, R. Garoby, S. Hancock, J. M. Jimenez, H. Medina, E. Metral, G. Rumolo, B Salvan, E. Shaposhnikova, F. Zimmermann

• **SPS beam from PS2 - M. Benedikt**

As LHC preinjector, the PS2 should be able to produce 170-168 bunches spaced at 25 ns with an intensity of 4×10^{11}. This intensity is determined by the choice of PS2 injection energy. The main LHC upgrade scenario requires 50 ns spaced bunches with an intensity of 5×10^{11} with nominal transverse and larger longitudinal emittance. This beam can also be produced in the PS2 with larger bunch length at injection (Is it possible in the 40 MHz RF system?) or by merging on the flat top in PS2. Shortening a bunch with longitudinal emittance of 0.6 eVs using rotation prior to extraction towards the SPS can be done with the same voltage at 40 MHz (1.5 MV) as needed for acceleration in PS2. In this beam production scheme 40 MHz cavities with a large tuning range should be developed. The feasibility of different beam manipulations depends critically on gamma transition which at the moment is fixed around 10 (both for a real and imaginary value).

The future CNGS/FT type of beam will have a structure in the SPS very close to that of the LHC beam, but with smaller intensity per bunch and larger total intensity. Bunch parameters will be also different: larger transverse emittance and smaller longitudinal emittance (needed for fast acceleration in the SPS). However large (more than 0.4 eVs) emittance is probably required for beam stability in the PS2 itself. The 5-turn island extraction needs to be studied for short bunches. Another question: how optimum will be an extraction of the CNGS type beam at 26 GeV/c?

• **The SPS impedance budget - E. Metral**

Progress was made by taking into account contributions from different types of kickers in the SPS. At the moment the model includes all 19 of them. Contributions from the BPMs are estimated to be much less important. Beam measurements are in reasonable agreement with the relative change of impedance due to the MKE kickers installation, especially for the total amount (and less year by year). The present HW budget seems to cover 50% of total impedance, both transverse and longitudinal. It was suggested to come back to the analysis of the contribution of the shielded MKE to the reactive part of impedance at low frequencies before applying this method to other kickers.

Some facts related to beam stability noticed this year in the SPS:

- coupled bunch-instability in vertical plane at 26 GeV/c with low chromaticity (Giovanni, Karel)

- μw-type signals during slow extraction of debunched beam at 400 GeV/c flat top (Karel)

G. Arduini informed the meeting about the development at SLAC of grooves for the SPS vacuum chamber with possible installation of the sample in the SPS set-up for e-cloud (SEY) measurements.

K. Cornelis showed a photo of a C-type magnet which has been found at CERN for SEY measurement set-up in the SPS. After the required vacuum chamber has been designed, the necessary steps for its production and installation should be taken.

• The next meeting (TBC) will be on **18 September 2007** at 16:00 in the JBA room (bld. 864).

Tentative agenda:

Preliminary results of e-cloud MDs in 2007 - G. Rumolo

News from around the table - everybody

• **Future meetings:**

October:

- Beam loss and radiation in the SPS for higher intensities and injection energy (G. Arduini)

November:

- Beam instrumentation upgrade (BI person)

Elena Shaposhnikova, 24.08.2007