

# SPS Studies Working Group

## Sixth Meeting – 27 July 1999

**Present:** G. Arduini, T. Bohl, H. Burkhardt, R. Cappi, E. Chapirova, K. Cornelis (chairman), W. Höfle, T. Linnecar, J. Tückmantel, J. Uythoven, L. Voss, F. Zimmermann, G. Roy (secretary)

**Excused:** K. Hanke,

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## 1 Follow-Up of Previous Meeting

G. Arduini reports that no orbit measurements have been done lately to survey the tunnel movements expected from LHC Civil Engineering work but the trajectories are stable in TT20 which indicates stable orbit at extraction.

## 2 MD Results

### 2.1 CPS

R. Cappi reports on recent progress in CPS:

- R. Garoby has managed to test the triple bunch splitting scheme. The experiment was successful although much work still needs to be done. An LHC-type beam using this technique will not be available to SPS before 2001 since it requires additional hardware to be installed to go from 21 to 42 and then to 84 bunches.
- LHC Beam: a beam with low intensity (single bunch) but nominal transverse characteristics has been produced. This experiment has revealed a ripple on the booster extraction kicker and damper specifications are being studied. The next step is to try with four bunches but some low-level RF problems need first to be solved.

### 2.2 Coherent Detuning

F. Zimmermann presented the coherent detuning measurements of 23 July. A single proton bunch was used and changes in bunch current was done by scraping the beam in the first SPS turns but detuning the injection steering. The change in bunch length was performed by ramping the RF voltage during the store.

Some problems were encountered with the vertical kicker for tune measurements and no transverse emittance measurements could be done (broken wire-scanner).

The results are not very good and different from those obtained in June by up to a factor four. Some uncontrolled parameters are suspected. The table below summarizes the measurements:

date	conditions	$\frac{\Delta Q_x}{\Delta N} \times 10^{11}$	$\frac{\Delta Q_y}{\Delta N} \times 10^{11}$
24 june	protons	$0.0015 \pm 0.0002$	$-0.0089 \pm 0.0004$
23 july	protons	$0.0067 \pm 0.0013$	$-0.032 \pm 0.004$
	$\sigma_z = 0.13$ mm ; v-damp ON	$-0.034 \pm 0.003$	$-0.0513 \pm 0.007$
	$\sigma_z = 0.18$ mm ; v-damp ON	$-0.039 \pm 0.004$	$-0.0305 \pm 0.007$
12 july	electrons (scaled)		
	1 bunch 2 bunches		$-0.031 \pm 0.001$ $-0.016 \pm 0.002$

## 2.3 Damper Pickup

W. Höfle explained that after installation of a high pass filter on the damper pickup (210) the effect reported at the two previous meetings was still present but the 600 and 800 MHz frequencies are excluded. The next step is to install a magnetic field in the pickup. It was noted that the bias voltage needed is not stable with time or different timings in the cycle. The signal observed corresponds to  $10^8$  electrons per bunch passage.

## 2.4 Transfer Lines

In the absence of K. Hanke, G. Arduini reported on measurements in the transfer line at 14 GeV with results corresponding to those obtained at 26 GeV; no saturation effect is visible. Similar values being obtained the same matching could be used for both energies. A dispersion mismatch is still present.

## 2.5 Kicker Ferrite Heating

An access is required but cannot be taken this week.

## 2.6 High Intensity

K. Cornelis reported that a high density beam of  $8 \times 10^{12}$  protons in a  $2 \mu\text{s}$  batch was successfully injected. This gives a local beam density equivalent to  $8 \times 10^{13}$  for the full SPS. The beam was kept for a few hours without tripping of the superconducting cavities. The  $\Delta p/p$  was measured when the beam was injected with RF off. This in order to test the feasibility of alternative injection schemes without a bunch to bucket transfer. Longitudinal profiles show a double peak distribution of the momenta in the beam, the secondary peak corresponding to a momentum offset of  $-0.6\%$ . The next step is to take this beam through transition.

## 3 Next Meeting

The next meeting is scheduled for Tuesday 10th August 1999, at 09:15, Room 865 1-D17. A reminder will be sent by email in due time and the agenda will be announced on the web page of the working group <http://wwwinfo.cern.ch/~ghislain/sswg/sswg.html>

G. Roy  
30 July 1999