

# Minutes of the SPS Studies Working Group (SSWG)

2<sup>nd</sup> meeting -28<sup>th</sup> March 2000

**Present:** G. Arduini, T. Bohl, H. Burkhardt, R. Cappelletti, K. Cornelis (chairman), W. Hofle, L. Jensen, J. Klem, D. Manglunki, E. Shaposhnikova, J. Tuckmantel, L. Vos, F. Zimmerman, M.P. Zorzano (secretary) **Excused:** T. Linnekar

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## 1 CPS Status (D. Manglunki)

The MD schedule can be found on the url <http://psdoc.web.cern.ch/PSdoc/ppc/md2000.pdf> as well as on the web page of the working group <http://home.cern.ch/ghislain/sswg/sswg.html>

The new problems that appeared with the modifications of the control system have been solved. The status of the machine for lepton operation is fine.

For proton beams: in the PS Booster there were problems with the water coolers of the RF-cavities, two of them have been changed already. The proton beam CPS.SFTPRO at low intensity is available. The beam is produced on the harmonic 2 in one ring of the PS Booster at the moment without splitting (PSB.MESPS). Splitting should be available for Monday 3rd April, this shall allow us to reach intensities higher than  $6.1 \times 10^{12}$  protons. MDPRO beam (fast extraction beam for high intensity studies) will be available on Monday 3rd April and LHC test beam for Wednesday 13th April.

(G. Arduini) There were high losses on the extraction to SPS.

## 2 SPS start up status (G. Arduini)

Protons have been injected at 14 GeV and successfully accelerated to 450 GeV. Alignment has been done on the optics 26/26 and on the lower tune optics 21/21. Beam position monitors have been checked (found 8 suspect monitors in SPS and 1 in TT10), 8 quadrupoles realigned (5 QD/3 QF) and 4 monitors fixed.

Leptons were accelerated to 22 GeV, and extracted to the last TEDs.

**Remark:** The basic instrumentation was in very good shape right from the start!.

Main problems encountered: An inter-turn short-circuit was found on the main dipole. The error kick as a function of time (in the ramp) shows a dependence that agrees very well with the expected  $1/B(t)dB(t)/dt$  behaviour. The extraction septum had a problem with the temperature interlock. There were also problems with the access interlocks of the doors in the new line for LHC and Gran Sasso TT40.

To be done: Aperture check and acceleration to 20 GeV of leptons with the super conducting cavities in stronger coupling mode.

(T. Bohl) The idea is to use the 200 MHz standing waves cavities plus the 352 MHz cavities with strong coupling. The coupling must be moved and conditioned (estimated time 24 h) but carefully since this has not been designed to be moved and there is a risk of destroying the super-conducting cavities. A number of checks have to be done with the lepton beams, ideally on the 1st MD.

(K. Cornelis) In the following weeks no proton beam is required for experiments. For the first 1+1/2 week SPS will operate with a 14 GeV injected beam in a  $2 \mu$  s batch, coming from a single-turn extraction of the CPS. Here studies can be done to test acceleration. On the next 1+1/2 week (starting on the middle of week 15th) the LHC test beam shall be ready. LEP will be filled using the economy cycle which we will use to accelerate the proton beam. In particular scrubbing tests will be done with the LHC test beam at intensities of  $4 - 5 \times 10^{12}$  protons. In this cycle protons stay during 6 s on a 26 GeV plateau.

### 3 SPS MD Instrumentation (K. Cornelis)

An overview of the instrumentation available or under development was presented, together with the contact people. In general an effort will be made to save data files from all the instruments in a consistent way: in a unique directory, with information in the default name about the super-cycle, date and if possible with additional comments.

1. Multi tune + auto trim (to set the trims automatically, particularly interesting for the LHC cycle). *L. Jensen, J. Wenninger*
2. BOSC
  - (a) Normal tune measurement (to be solved: it measures only every second cycle, file saving, at the moment it is only available for one user) *L. Jensen*
  - (b) Tune measurement along a batch with 6 channels (to be solved: bandwidth, AC-coupling, availability of sum signal to measure intensity, file saving, editor to select acquisition times) *L. Jensen, M. Albert, H. Jacob.*
  - (c) For 2001: an instrument to measure bunch to bunch is under development *A. Burns*
3. Wire scanners (to be solved: operation at dispersion free regions, multi users, in and out scan in the same cycle, multi acquisition along a batch on the same cycle, interface with other programs like PASSERELLE for momentum spread measurements) *J. Koopman, G. Crockford*

4. OTR (matching) (to be solved: multi-turn, interface to other programs) *R. Jung, J.J. Gras, J. Klem*
5. Continuous emittance measurements. Beam size as a function of time over one cycle using prototypes that are under development (rest-gas ionization monitor, rest-gas fluorescence, ion beam scan based on deflection measurements, spectrometer of ion energy) (to be solved: interface, and calibration) *J.J. Gras, C. Fisher, R. Jung, C. Arimatea* and possibly some member of the AP group.
6. Slow BCT: measurement of the total current in the machine as a function of time (to be solved: no saturation at high currents, interface with other programs) *H. Jakob, M. Albert*
7. Fast BCT: individual bunch intensity measurement (to be solved: it is needed to measure in the TT10 and ring simultaneously) *J.J. Savioz, A. Guerrero, R. Giachino*
8. Collimators: for control of beam intensity (to be solved: operational with *beta-software*) *R. Jung, X. Altuna*
9. Head-tail measurements: This consist of a wide-band pick-up connected to a special scope. It is foreseen to be used for the LHC to measure dynamically the chromaticity. For the SPS it will allow to investigate the instability associated to the electron-cloud problem to distinguish single from multi-bunch instability. *R. Jones, A. Ferrari*
10. Directory and filename management *L. Normann, M. Albert*
11. Combined measurements with PASSERELLE or other means. For instance longitudinal emittance (2 wire-scans and bunch length), dispersion matching, betatron matching *D. Jacquet*
12. Multi-turn (MOPOS) (to be solved: availability from console, file saving, acquisition time in batch) *J. Klem*
13. MOPOS in closed orbit mode *J. Wenninger, S. Jackson*

## 4 Next meeting

The next meeting is scheduled for Tuesday 11th April, at 09:15, Room 865-1D17. 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://home.cern.ch/~ghislain/sswg/sswg.html>

M.P. Zorzano 28th March 2000