

## Status of the machine studies

APC meeting, 20/06/08

### 1) Last MD of 2007: Desorption experiments at LINAC 3 in order to study the dynamic outgassing of lead ions impacting on warm targets important for LHC and LEIR operation with heavy ions (E. Mahner)

- Took place from week 46 to week 51, no beam taken during target changes and bakeouts in week 47 and week 49.
- 3 different targets were tested: stainless steel (for reference), NEG/stainless steel (activated/saturated), Au/Cu target as potentially low-outgassing collimator material.
- The ion source stability and Linac3 reliability were excellent. The following beams were delivered: Pb53+ at 4.2 MeV/u, Pb29+ at 4.2, 3.1, and 1.8 MeV/u. Intensity for Pb53+:  $1.5 \times 10^9$  ions/shot (22  $\mu$ A, 600  $\mu$ s pulse length). Repetition rate: 1 shot/1.2s.
- Data analysis started but not finished.
- Next step: A new proposal for Linac3 desorption studies has been prepared.

### 2) Signal measurements of the new LHC-BLM installed in the BTP line, in order to understand the high level of radiation Rue Goward (S. Aumon)

- Losses with the beam NORMGPS could be seen from BLM signals in the BTP line when the beam was not injected in the line. After a re-steering of the beam in BT, the losses disappeared. The high radiation level Rue Goward seems to be due to losses on the septum in section 42 and not because of losses in the transfer line itself.
- The next step was to make activation measurements of the septum 42 in the PS and in Rue Goward with the collaboration of the Radiation Protection group on May 22, 2008. Results still to be analysed.

### 3) Test of beta-beating tools for the LHC (R. Tomas)

- On 02/06, the beam was absent  $\sim$  60% of the time and unstable (PS pbs, SPS servers which needed to be rebooted many times etc.). On 05/06 no beam available (problem with the trim which caused beam aborts). On 06/06 the conditions were finally good!
- Measurement of phase-beating and dispersion beating successful. Knob generation for the correction was successful too. Correction worked and horizontal phase beating got reduced by almost a half. Connection to YASP tested but not successful.
- Next step: Connection to YASP

### 4) Setting-up and optimization of the high-energy part of LHC25/TSTLHC25 (H. Damerou)

- This was not possible to do it in parallel on Wednesday 04/06/08 (not enough cycles in the PSB and the archives are not reliable at the moment). It was agreed with Wolfgang Hofle (who was supposed to do the setting-up of the transverse damper during the whole day) to let the PS work from 08:00 to 14:00.
- LHC25 has been optimized at nominal intensity ( $\sim$  9E12 p/p). The high-energy longitudinal blow-up has been advanced to start shortly after transition and the coupled-bunch instability feedback has been adjusted and switched on. Bunches of nominal longitudinal emittance are ejected with an average length around 3.6ns. This continues to be the case - without touching the synchro or any other parameter - when only one Booster ring is injected.
- LHC25 was longitudinally ready for the scrubbing run.

### 5) Setting-up of the SPS transverse dampers (W. Hofle)

- This work was delayed because the PUs used (204 to 207) are shared with BI and some (planned) modifications were done, but Wolfgang was not informed. Furthermore there were even more important pbs. Interventions were required and this issue was finally fixed.

### 6) Controlled transverse emittance blow-up in the SPS with transverse damper (D. Manglunki)

- We were stuck because one could not measure the transverse emittances with the BWS. This was followed-up by Elliott Mc Crory and Ana Guerrero and one could measure on the BWS 414 during the scrubbing run. These studies can now continue.

### 7) Status of the fast analog signals in the SPS (I. Kozsar and U. Wehrle)

- 4 timings are now declared for the SPS fast analog signals (as was already done in the PS):
  - 1) SX.C-TREV-OASIS (in Working Set OASIS),
  - 2) SX.TREV-INTERV (in Working Set OASIS),

3) SX.N-INTERV (in Working Set OASIS),

4) SX.MULTI-AQ-TS (in Triggers in OASIS).

- Urs checked all the signals and triggers (Many thanks!). The problem now is that the programmable attenuators (at the entrance of the sum signals) do not work (there is a control from working set but it has no effect). A person from OP (to be seen with Karel) should follow this up as it is not covered by CO (it is not CO equipments).

**8) Final setting-up of the feedforwards (TWC 200 MHz) in the SPS and of the TWC 800 MHz in view of the scrubbing run (T. Bohl)**

- On Thursday 05/06 and Friday 06/06, the feedforward was adjusted under the conditions that were available (not ideal). TWC 800 MHz was checked.
- Unstable beam from PS and transverse damper not fully operational in the SPS. Difficulties with long. damper gain functions (ROCS).
- Feedforward OK for 26 GeV/c (no acceleration). TWC 800 MHz prepared for scrubbing run.
- Next steps: Adjustment of feedforward, long. damper and TWC 800 MHz for acceleration to 450 GeV/c with nominal LHC beam.

**9) Ecloud and related instabilities measurements during the scrubbing run**

- Many measurements of ecloud and induced instabilities were taken. Data still to be analyzed.

**10) Study of the radiation levels on top of the TDC2 tunnel in the North Area vs losses at the TT20 splitters (H. Vincke)**

- It was planned to measure the radiation field on top of TT20 and TDC2 during mis-tuned beam operation. After the tuning process to get ideal beam conditions, intentional mis-tuning of the beam line was planned in order to simulate realistic malfunctions of the line during operation. During this period it was planned to study the effect of this tuning on the radiation levels on the surface level above TT20. Key zone on top of TT20 was the area around bldg. 898 (ventilation building) and the area above the splitters in TDC2
- Due to SPS machine problems the tuning process was delayed by several hours. We could only measure on top of TT20/TDC2 during the initial tuning phase.
- During the initial tuning period we could see elevated dose rates close to the building and above the splitter.
- Next steps: We will perform measurements during normal operation in TT20/TDC2 in order to scan the surface area at this location. The mis-tuning measurements will have to be done after the scanning measurements during a dedicated MD.

**11) Study of the fast vertical single-bunch instability at SPS injection with a bunch of low longitudinal emittance (B. Salvant)**

- Some measurements were done with the PSB/PS/SPS beam LHC PROBE/MD4/LHCFAST. "More precise" ones will be redone in the near future on the SPS MD segment (longer injection plateau).

**12) Status of the BWS and IPMs (E. Métral)**

- Today (20/06/08) we checked with Elliott which wire scanners are working: They seem all OK (but a detailed analysis of the data remains to be done!) except 517 => To be followed up.