

Status of the machine studies

APC meeting, 15/08/08

1) Study of the losses in the PS during the classical CT extraction (High-intensity and CNGS) (S. Gilardoni)

- PSB was unavailable. Only one hour would have been available and it was decided to give it to Heiko's MD => To be re-scheduled.

2) Optics and trajectory of AD beam in TT2-FTA lines (S. Gilardoni)

- The extraction and the line had to be adjusted. The screens in FTA were not operational. BI intervened to fix the problem. Actually there was no time to measure the optics.
- After the different adjustments, the pbar intensity was increased from 2×10^7 pbarpp to about 3×10^7 pbarpp.
- E. Benedetto computed a new optics to compensate the lower current delivered from the last quadrupole => A new day will be arranged with AD to try the new optics.

3) Beta-beating correction tests for the LHC (R. Tomas)

- In the early morning there was a problem changing the RF radial loop. This affected other cycles than the MD1 and a bug in the system had to be fixed (from 8:00 to 10:00). Some problems in the pre-injectors did not allow beam in the SPS for a good fraction of the time. The need to reboot the BPM crate "mu40s" 5 or 6 times also stopped us from taking data for about an hour (integrated). Last beam was seen before 17:00 due to problems with the injectors. We waited for the beam even late at night. But the beam did not come.
- With the little useful time we managed to: -test and fix new general features of the GUI -test the newly implemented MICADO correction -test the new connection to YASP to set correctors rather than creating a controls knob -take one YASP scan data set for COD analysis with better data quality than in the past.
- Next steps: We need at least 3 YASP scan data sets for statistics. Coupling and vertical measurement and correction is also pending.
- New requirements: some more time with beam, ~4 hours?

4) h8/h16 PS extractions with CT (S. Gilardoni)

- The PSB was down for about half of the MD time. Then the beam could be prepared before the MD only for the longitudinal part. The optimization of the CT extraction was possible only by using all the MD time, since the day before the PSB was not stable.
- OASIS not stable. PSB down frequently. Two electronics module of the BFAs fine delay found broken.
- The CT extraction spill, for the unbunched case, could be properly tuned thanks to the bunched beam tuning. This reduced significantly the losses in the SPS.
- Next step and requirement: Do the MD another day.

5) Provide beam for SPS long. and transv. impedance measurements (B. Mikulec)

- The steady intensity variations that were required needed frequent fine-tuning.
- The required beam could be produced with constant long. emittance and intensity ranging from 5×10^9 to 140×10^9 . Intensity changes were very fast such that intensity scans could be performed within about an hour and determined by the speed of data taking.

6) Studies of the fast instability at injection in the SPS (B. Salvant)

- Several MD slots between August 4th and August 8th, with relatively good beam conditions.
- We could not observe the double intensity threshold during these sessions. In addition, many MD slots were performed at night when none was in the PS central building anymore to check and correct the quality of the extracted PS beam. Losses in the PS at medium high intensities were observed. Finally, I had issues with setting the chromaticity in the SPS, as YASP values for DeltaP could not really be trusted.
- The new scope on the transverse pickup was used and will be benchmarked with both the Wall current monitor and the HeadTail monitor. Intensity scans were taken with SPS RF off and no bunch rotation in the PS to get long bunches. Several scans were taken and the fast instability was observed.
- The next step would be to check with the PS if we can lower the voltage to get even longer bunches (and then we will take this beam in the SPS with RF OFF). Also, we need to control more what is extracted from the PS, and therefore make sure that we have all relevant parameters and knobs.

7) SPS Matching Monitor (E. Benedetto)

- Conditions: Yes (->beam, 12-bunches LHC25), No (->CCD camera).
- Unable to get images of the beam. First it was thought that it was a problem of timing/triggering, but after removing the camera in BA5 it was realized that it was not responding and would have needed to go down in

the tunnel to manually restart it. It is not known why the camera tripped (probably radiations? but why last year was ok?).

- No results for the SPS matching monitor MD.

- Measurements of beam profiles (semfiles and otrs) in the TT2-TT10 line to check the matching. Good results in terms of emittances and mismatch if no bunch rotation at PS extraction, strange profiles if bunch rotation was on (was it because of higher dispersion contribution or because of instabilities and different bunches relative offset? to be analyzed).

- Next step and requirement: Another MD for the matching monitors (~ 8h). Finalize analysis measurements in the line.

8) InCA validation (S. Deghaye)

- During this MD, the latest version of InCA was put in production to assess the validity of the architecture. The main point was the validation of the scalability of the system.

- Next steps: Some components have shown deficiencies and more developments are required before the next validation.

- New requirements: Longer MD periods with low intensity beams would be useful to study the mid-term behaviour of the system and be able to correct the problems as they appear.

9) Long Injector MD of this week 33 (E. Metral)

- Could start the setting-up only at ~ 05:00 on TU 12/08 instead of 16:00 on MO 11/08 (recovering from SEH31 change in the PS).

- Vacuum bump in LSS5 => This is certainly due to the new ecloud liner which was changed and which is outgassing a lot (certainly due to the kapton...). Usually it is said that "Kapton is regularly used as an insulator in ultra-high vacuum environments as it has a low outgassing rate"...

- When the Longitudinal Feedback (Damper) was ON, the radial position at 3000 ms (where we made chromaticity meas.) moved from ~ -0.04 to ~ -0.70. This still has to be understood. As the chromaticities were not 0, the tunes changed...

- We could adjust the 4 injections kicker timings looking at the LHC BPM (see logbook) and had a relatively nice beam with 4 batches ready for RF MD by ~ 20:00 on TU 12/08.

- Nobody succeeded to use the AutoQ => It is a pity as we could not check the evolution of the tunes along the cycle and we could not adjust (easily) the compensation of the Laslett tune shifts for 75 ns (compared to 25 ns).

- Measurements with the BWS519 at injection gave values comparable to the ones from the PS, which seems satisfactory. Measurements at the end of the flat-bottom "seemed" to reveal some blow-ups. Was it real or not (small amplitude of the signals measured...) => To be followed-up.

9.1) BQK calibration

- Data to be analyzed in more detail, but it gave already an estimate of the kicker strength's order of magnitude.

- To be continued next week with the beams which will be taken on LHCFAST1.

9.2) RF MDs on 25 ns beam

- It seems good RF measurements could be performed.

9.3) ecloud MD on 25 ns beam

- It seems the ecloud instability did not show up very nicely. Reminder: This was already observed last year... (was this due to the possible larger transverse emittances?..)

9.4) MD on 75 ns beam

- BCT with 4 batches seems quite good, but here also a transverse emittance blow-up seem to be observed. To be followed-up.

9.5) MD on 50 ns beam

- We tried and inject 4 batches with 50 ns beam and had pb with MKD interlock, which could not be reset (for several hours). Furthermore, ZS ion trap tripped with 4 batches beam => Took 1 batch only.

10) Status of the SPS BWS (E. Metral)

- The old application is available now (the new one is not available anymore. They continue to work on it).

- The (high-intensity) wire was used during the Long MD: 51995.

- The (low-intensity) wire (to be used for the LHC pilot): 51731, is still not available (I checked with Ana today) => It will be good to have it for next week to measure what will be sent to the LHC during the week-end (2nd injection tests).

11) Status of the fast Analog Signals in the SPS (E. Metral)

- We (Joseph Kuczerowski) asked (on 01/07/08, 15/07/08 and today 15/08/08) to increase the sampling rate for the fast analog signals from 2 to 8 GHz and the number of points to 128 Mpoints in OASIS (as the ACQUIRIS card can do that) but we did not get any feedback from CO. I discussed today with Stephane Deghaye and Claude-Henri who will follow this up.
- These signals would be also very useful for the TMCI (or other) studies.