

Week 31

Nominal 150 ns beams to the SPS under standard PS conditions (E. Métral, T. Bohl, et al.)

From the point of view of the transverse plane, no significant change was observed with respect to previous MDs. The 150 ns beam was taken on Monday 02/08 on LHCFast3/LHCMD to check the nominal intensity beam, which was never sent to the SPS during the previous MD sessions. First, in the morning, the beam was sent to the SPS with the nominal PS longitudinal emittance. This beam exhibited a quadrupolar instability in the PS. Later on, in the afternoon, a more stable beam could be injected into the SPS by increasing the longitudinal emittance in the PS to stabilize the beam against the observed quadrupolar instability. It should be noted that already at the end of the morning the beam appeared to be more stable than at the beginning of MD session. However, this is not understood because S. Hancock confirmed that he did not change anything in the PS. The cases with and without longitudinal emittance blow up have been compared and they seem to be very similar. T. Bohl measured the bunch length at top energy to be ~ 1.3 ns without longitudinal emittance blow up and ~ 1.5 ns with the blow up. The satellites are below 1%.

<https://ab-mgt-md-users.web.cern.ch/ab-mgt-md-users/2010/StrategyForMachineDevelopmentStudiesIn2010 IEFC 06-08-10.pdf>.

Single-bunch (TMCI+longitudinal) studies in the SPS with higher intensities than nominal (B. Salvant, W. Höfle, E. Shaposhnikova, et al.)

The transverse and longitudinal emittances in the PSB and PS were measured when shaving longitudinally in the PSB to get to $1.5e11$, $2e11$ and $2.5e11$ p/b. The transverse emittances are made now much closer to nominal LHC values ($\sim 3.5\mu\text{m}$ in both planes, measured at the PS extraction) thanks to a voluntarily mismatched injection into the PS (the PSB would produce emittances of about $1.5\mu\text{m}$ in both planes). In the SPS chromaticity, coupling and amplitude detuning were measured for a high intensity bunch ($\sim 2e11$ p). The transverse intra-bunch signal could be recorded both with the HeadTail monitor and W. Höfle's wide-band pick up. Unfortunately the HT monitor did not record the first 200 turns, during which there appear to be some sharp losses for injected intensities above $\sim 2e11$. Measurements in the longitudinal plane were also taken and an instability was observed for bunch intensities above $1.9e11$ p. Significant losses at injection were observed in the SPS, probably due to the strong space charge and high chromaticity (for corrected chromaticity the beam would become unstable). The bunch was always dumped before the ramp.

Issues to be reported, some of which contributed to limit the total MD time to ~ 8 hours out of the allocated 3 shifts of 10 hours:

- MOPOS: the necessity to disconnect the MOPOS for this type of MDs strongly limits the machine availability. This should improve soon, when attenuators will be installed in the three sextants not yet equipped with them.
- HT monitor misses the first 200 turns.
- Wire scanners in the PS
- Miscellaneous hardware issues in SPS, PS, PSB brought the machines down a few times

Week 32

Ions to the PS -one week ahead of schedule (S. Hancock, H. Damerau)

The setting up of the ions in the PS has advanced well during this week. Starting with the very first beam on Monday afternoon, the beam control in the PS has been fully put back into operation and performs as expected (no electronics broken, all loops ok, etc.). The PS user LHCION was used for the early ion beam (coupled to the LEIR user EARLY). The early beam is extracted within longitudinal specifications (i.e., $6.5E9$, $ez=10eVs$, $bl<4ns$) from the PS (http://elogbook.cern.ch/eLogbook/event_viewer.jsp?eventId=1316753).

The PS user MDION was used for the nominal ion beam (coupled to the LEIR user NOMINAL). Setting up already started on Thursday August 12th. All RF manipulations work fine and a bunch train of four bunches, also essentially within longitudinal specifications, could be extracted (http://elogbook.cern.ch/eLogbook/event_viewer.jsp?eventId=1317281).

Pending issues:

- Radial position along the cycle
- Quality issues with OASIS signals (understood, but needs fix)
- Intensity from LEIR at PS injection too low
- Transverse parameters yet to be checked -> OP

Once the transverse parameters are checked, one could proceed with the setting up of the transfer line towards the SPS next week.