

## SPS operation in Week 39 (24-30/09) – From J. Wenninger (SPS coordinator)

Monday morning started with a bad surprise in the North Area where a magnet fault appeared on quadrupole QNLF2405 in the TTT24 line between the second splitter and target T4. Since this area is very hot, it was decided to replace the magnet during the almost 3 days of MDs that would start Tuesday morning. In the meantime the beam steering was changed to only serve T2 and T6 until Tuesday morning.

A first 24 hour period starting Tuesday 08:00 AM was devoted to LHC beam studies in pulsed mode and in coast.

A second 24 hour period starting Wednesday 08:00 AM was devoted to alternate high intensity extractions to the TT40 and TT60 TED. The maximum intensity was  $\sim 1.3 \cdot 10^{13}$  protons in 4 batches on 72 bunches (bunch intensity  $\sim 4.5 \cdot 10^{10}$  p, i.e.  $\sim 1/2$  'nominal'). Each extraction channel was tested with increasing intensity, before a sequence of 24 extractions were alternatively send to TT40 and TT60 around 22:10. The rest of the night was used to measure the kicker waveforms with pilot bunches.

The ion MD could profit from the early end of the TT40/60 MD and started earlier. The MD was devoted to energy matching between PS and SPS (as far as I know).

Normal FT operation finally resumed Thursday evening around 20:30 (beams on targets). The rest of the week was quiet for FT beams, except for 2 longer interruptions due to the injectors (beam stopper on Friday morning, electrostatic septum on Saturday morning).

Friday afternoon, after some last target scans, a 24 hour operation period started for CNGS with 2 batches of  $4 \cdot 10^{12}$  protons. Running was smooth, only interrupted by the septum problem (PS) and by a logging problem (stop requested by Edda). I monitored the extraction interlock system and observed about 5% of missing extractions due to interlocks. Almost all interlocked extractions are due to 2 interlocks, the BLMs in TT40 and the FMCM (Fast Magnet Current change Monitor) on the septum MSE.418. The BLM interlock is not due to losses but to a timing problem of the BLM crate that does not give green light in time. For the MSE the problem is due to the PC noise that sometimes triggers the FMCM. Both problems will be followed up next week. We also had 2 occurrences where fake BPM interlocks latched and stopped extraction. In both cases a reset was performed and OP resumed. But there was also one very interesting event that occurred by chance while I was monitoring the trajectory and the interlock system: the BPM system generated a latched interlock on a real trajectory perturbation that was due to a source located at the entrance of the line. It should be noted that the perturbation just exceeded the 0.5 mm tolerance on target by few microns, so nothing too dramatic. From the oscillation phase the source is consistent with the MKE extraction kicker (but not with the septum). A quick analysis, based on a comparison with kicker voltage scans performed last year, revealed as a possible cause a MKE kick at 48.6 kV (instead of the nominal 50 kV). This is still within the  $\pm 2$  kV allowed window of the MKE Beam Energy Tracking System (this limit corresponds  $\sim$  target position tolerance). It will be interesting to have a look at some of the logged data.

Final point: Since Monday we had problems with RF transmitter 3. Despite lots of hours of work by the RF power people, it took until Saturday evening to repair it. It is running again now - let's hope for the best.