

MSWG Meeting #10, 27-July-2018

Present: S. Albright, F. Asvesta, M. Barnes, H. Bartosik, M. Carla, E. Chiaveri, K. Cornelis, M. Fraser, E. Koukovini-Platia, V. Kain, M. Kaitatzi, T. Lefevre, D. Moreno, G. Rumolo, A. Saa Hernandez, F. Velotti.

The minutes of the last meeting were approved.

Agenda:

[Link to the Indico Event:](#)

- Approval of minutes – Karel Cornelis
- Status of operational Beams – Machine supervisors
- Main presentations:
 - Detection and elimination of the tune ripple in LEIR – Daniel Moreno

Status of operational Beams

[PSB – Jean-Francois Comblin](#)

All OP beams are OK at 98% and the LHC MD went smoothly. The intensity limitation from the RF on Ring 2 was solved by HL and LL specialists recently and another issue on the current drifting on BT-BHZ10 caused issues with the HI beams. The tune was successfully measured on R3 using chirp excitation, a YASP bug fixed on BT3.DVT.30/40. A list of on-going MD studies was presented.

[PS – Matthew Fraser](#)

A good week for the PS at 95% availability with very few faults in the PS. OP beam OK and LHC MD beams provided thanks to a timely RF set-up and preparation of the 8b4e BCS and iLHC200 beam. EAST North are requesting extra spills with the start of the PANDA/RE22 experiments on T9. Tentative agreement to roll out new cycle with 2.5 GeV/c intermediate plateau with longitudinal blow-up on 1 August (next week). The Very Low Intensity (VLI) MTE cycle was used with success in an SPS MD using 20 – 50E10 ppp.

K. Cornelis asked about the low chromaticity LHC, to which **M. Fraser** explained this is a long running MD in the framework of LIU to deal with the larger momentum spread. The cycle is set-up with very low chromaticity in the H plane and requires the TFB to stabilise the beam. Studies are on-going to go closer to zero.

[SPS – Hannes Bartosik](#)

OP beams oaky but issue of MTE splitting on the second cycle in the PS is under investigation. Recent emittance measurements of the OP LHC BCMS25 beam were compared to the brightness curve at SPS extraction. A list of MD highlights during LHC MD week was presented, including crab cavity MD's,

partially stripped ion (lifetime of 40 hours measured at flat-top in LHC) and a set of slow extraction MD's,

K. Cornelis asked if the onset of the second instability observed on the HI BCMS (2.2E11 ppn) MD's after about 10 seconds is at exactly the same time in the cycle. No, and it does not appear related to an event in the machine. To be investigated. Last year the same phenomenon was observed but not so reproducibly. **K. Cornelis** asked if the blow-up cause longitudinal losses? **H. Bartosik** explained that is difficult to separate the source of the losses as they are already large (about 25%).

Main presentations:

[Detection and elimination of the Tune ripple in LEIR – Daniel Moreno](#)

A tune ripple was first evident at the end of last year when using the Q-meter. Further investigations showed a frequency of around 550 Hz as measured on the beam. The 550 Hz signal was clearly observed on the FFT of B-train measurements of the main dipole field (in BHN30), which motivated an investigation of the difference circuits to find the source. Tests showed that switching off the sextupole windings found on each end of the main bending magnets made the ripple disappear. The circuits (XFW) were used in LEAR as harmonic sextupoles to improve the dynamic aperture. There are two circuits but only the circuit XFW01 manifests the effect and is located at large dispersion. Turning off the converter connected to the circuit reduces the tune ripple by about a factor of 20 and increases the intensity extracted by about 10%. The impact on the tune is postulated as sextupolar feed-down although the calculations presented cannot account for all the effect observed. The idea is to continue with the characterization and to use the dispersion in the XFW01 position to measure the sextupolar impact on chromaticity. In conclusion, a dangerous tune ripple has been removed probably produced by a feed-down effect.

It was reminded not to turn on the PFW as it is not a PPM device!

Discussion:

K. Cornelis asked that as the tune ripple was different at different dates was the actual current ripple measured? No, only measurements on the beam were made. **H. Bartosik** emphasised that the next step is measure the chromaticity changes due to the XFW. **D. Moreno** clarified to **S. Albright** the highest intensity was taken over many shots with the XFW on and off, quoting the difference of 10%. The effect is clearly reproducible. **H. Bartosik** clarified that effects depend on the mean momentum deviation, not spread, and can be varied through radial trim; that's the plan for the chromaticity measurements.