

MSWG Meeting #4, 20-April-2018

Present: S. Albright, A. Alekou, R. Alemany, F. Antoniou, F. Asvesta, M. Barnes, H. Bartosik, T. Bohl, M. Carla', K. Cornelis, H. Damerou, G.P. Di Giovanni, V. Forte, M. Fraser, A. Gerbershagen, S. Hirlander, V. Kain, K. Li, A. Huschauer, V. Kain, G. Papotti, H. Rafique, F. Roncarolo, G. Rumolo, J.L. Sirvent, F. Tecker, F. Velotti, R. Veness

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:
 - Prototype Wire Scanner: status and plans in 2018 – Federico Roncarolo
 - SPS cycle requests for partially stripped ions to new MD tool – Reyes Alemany
 - SPS beam-based alignment and aperture in 2018 – Verena Kain

Status of operational Beams

[PSB – Simon Albright](#)

OP beams OK. Downtime since last MSWG dominated by BR1.QDE2 thermal cut-outs from a faulty temperature sensor. Although it was mostly non-blocking, availability unknown as AFT not currently treating switch between blocking and non-blocking state correctly.

Wire of prototype wire-scanner found broken during an intervention.

Scheduling and communication of dedicated MD on Wednesday (non-PPM switch of BTP quadrupoles and connection of “quad in the wall”) needs to be improved with LHC: MD needed rescheduling on the fly at the last minute.

Reliability run with White Rabbit on-going on ISOLDE beam with very small differences on measured field observed. Planning to run for 2 weeks on ISOLDE before rolling out to more users if there are no problems.

R. Alemany pointed out that this was already an issue last year, what's being done? **V. Kain** brought this up in the IEFM and **R. Steerenberg** will organise a short Monday meeting between the injectors and LHC to specify what constraints will be in place from MD's and accesses during the week.

[PS – Frank Tecker](#)

Status of OP beams presented. It was pointed out that longitudinal preparation of Early ion beam (Pb54) without beam completed: should now be able to take beam.

Broken power supply on pulse repeater caused the internal dump to fall into an undefined state, along with missing timings for transition crossing, extraction bump and kickers. The internal dump perturbed the dedicated BTP MD and transmission estimates, however, kick response measurements could be made. The issue delayed restart after the MD.

EAST area T10.QDE01 magnet issue is limiting physics to 5 GeV/c instead of 6 GeV/c.

H. Bartosik asked when high intensity LHC beams will be ready for MD's: **H. Damerou** reported they should be set-up shortly after IPAC.

[SPS – Hannes Bartosik](#)

On-going adjustment of extraction losses on SFTPRO: a loss dependence with intensity/duty cycle/SC, being investigated, as well as slow drifts since the first alignment. LHC25 is fully setup: 4x 72b, 1.1e11 p/b within 2.5 um. BCMS needs some tune adjustments and INDIV set-up with 4 bunches. AWAKE OK. Improvements to LHC beams were mentioned and progress with new applications were mentioned. BSRT is being commissioned and a Vistar is now available for use at extraction with emittance values to published.

A. Huschauer enquired about the intensity increase on SFTPRO. It is not yet clear and is still to be scheduled, but the limit will not exceed 3.5E13 ppp in the SPS: increase not expected until the end of next week.

[LEIR commissioning – Reyes Alemany](#)

LEIR commissioning is on-going. The source is still very unstable, which makes it difficult to work on optimization. Nonetheless, work is one week ahead of schedule. This afternoon extraction to PS will be attempted.

H. Bartosik asked if there is any time estimation of when the source stability will be improved: not yet, as it is still in “commissioning” and is to be followed-up.

Main presentations:

[SPS cycle requests for partially stripped ions – Reyes Alemany](#)

The motivation for the Gamma Factory Proposal was outlined, using Pb80+ and Pb81+ in the LHC. The pre-requisite MD's needed in the SPS to demonstrate that the lifetime of partially-stripped ions is long enough for a proof-of-principle experiment can be prepared during LS2. The MD's proposed were outlined and further details can be found in the presentation:

- PS/TT2/TT10 with Pb80+ and Pb81+
 - Attempt to be parallel during PSB intervention, but otherwise it will have to be dedicated. Using a foil at BTV352 an experimental cross-check of the theoretical

predictions for the stripper foil transmission efficiencies for high energy partially stripped beams will be attempted (for the first time ever).

- Determine which species, 80 or 81, give better transmission in view of an LHC MD.
- SPS with Pb80+ AND/OR Pb81+
 - Dedicated MD to be carried out before LHC MD2: before 23/07/2018
 - Most important MD: measure lifetime of PbXX+ and prepare cycle of PbXX+ at 450Q GeV/c for LHC MD
- SPS with Pb54+
 - Parallel MD that can be carried out any time.
 - Check SPS vacuum calibration with Xe data

Discussion:

T. Bohl asked for clarification that the species of the Pb will be 54+ in the PS. **R. Alemany** stated that stripping between LEIR and PS has been ruled out. **K. Cornelis** recommended that the last MD for vacuum calibration is done before ions are sent to the North Area, otherwise it would no longer be parallel. **H. Bartosik** stated that there is not enough time for all MD's and priorities need to assigned based on results.

[Prototype Wire Scanner: status and plans in 2018 – Federico Roncarolo](#)

The prototype WS system was overviewed in detail from mechanics, layout of electronics, control electronics along with the detector and its acquisition system. Links to a comprehensive set of documentation meetings/reviews were given. The calibration of the angular position of the rotating wire is measured with a laser on a test-bench in the laboratory looking at an optical disk on the scanner. RMS errors of about 20 um have been achieved, compared to 100 um with the present scanners. In addition, the reproducibility of the position and speed of the wire can be measured. It was noted that in the machine, EM coupling and S/N level problems are being seen with the PS prototype resolver due to the long cables and are to be investigated further. First profile measurements with beam of the prototype in the PSB and SPS were presented, showing promising results. The status, plans and timeline were presented in general: 3 prototypes are now installed in PSB, PS and SPS. The timeline for the mechanics and electronics was also presented. Finally, the plans for tests with beam this year before LS2 were outlined.

The broken wire and loose kapton wire (outside beam aperture) on the prototype in the PSB is under investigation. The wire will be replaced as soon as possible, ITS1 at the latest.

Discussion:

K. Cornelis understands that the prototypes must go from prototype to operation this year. Indeed, **F. Roncarolo** acknowledged that a lot of work needs to be done. With respect to the broken wire, it is not thought to be the same fault as occurred on the SPS prototype last year. **S. Albright** was informed that an intervention on the PSB would take an estimated 24 hours and is limited by vacuum pump down. **F. Tecker** asked if the noise issues in the PS renders the wire-scanner inoperable or not: investigations on-going but it could be operated in a degraded mode.

[SPS beam-based alignment and aperture in 2018 – Verena Kain](#)

Beam based alignment in the SPS is optimized for both Q20 and Q26 by re-aligning quadrupoles and nowadays the aperture is checked with an automated scan routine bumping the circulating beam on to the aperture (using low intensity $5e11$ ppp MTE beam).

The details of the beam-based alignment procedure and results were detailed. The closed-orbit of the LHC beam improved the most. It was pointed out that the quality of the BPM measurements is important but the electronics and cables appear to be degrading over time. New electronics are expected after LS2.

The details of the aperture measurements were discussed along with the effect of the RF on the measurement. The aperture is reproducible year-to-year and most bottlenecks have been removed since 2016. After the recent YETS only the aperture restriction at 423 was removed with the replacement MBA.42370. The situation at 107 is not clear but the RP survey indicates there might be an issue with a flange in SSS QF.332. No change in aperture was observed after the exchange of the flanges with eccentric bellows at MBB to QD–SSS transitions providing asymmetric bottleneck at QDs with large dispersion. It is expected that the RF fingers might still be constraining the aperture. We might tackle one location during TS1 or TS2 (probably 113) to better understand the issue.

Discussion:

K. Cornelis asked if the design of the RF fingers will change at the aperture location. The design will not change this year but it is hoped an understanding of the issue will be attained. The impact on impedance must be understood if in a future flange design the RF fingers are removed.