# rMPP meeting on MD1 2023 approval

The meeting took place on Friday, **June 2ⁿᵈ, 2023, 10.00-11.00,** via zoom.

Participants:
X. Buffat, A. Butterworth, M. D'Andrea, L. Giacomel, A. Guerrero, C. Hernalsteens, G. Iadarola, L. Mether, C. Montanari, F. Moortgat, K. Paraschou, M. Rakic, S. Redaelli, B. Salvachua Ferrando, M. Solfaroli Camillocci, R. Steerenberg, J. Uythoven, H. Timko, G. Trad, C. Wiesner, D. Wollmann

The slides of all presentations can be found on Indico. The MD procedures can be found on ASM.

## 1   Introduction

J. Uythoven welcomed the participants. C. Wiesner explained that, prior to the meeting, rMPP members had reviewed the MD procedures and selected five MDs to be presented in more detail. Furthermore, comments to five additional MDs will be given and discussed.

## 2   rMPP comments on MDs

The initial comments and questions can be found here. The following remarks and clarifications were given in the meeting:

- MD7007 (Operation of Crystal collimators during energy Ramp)
  - The proposed settings of the collimators at flat top should be stated explicitly in the procedure. **M. D'Andrea agreed and will update the procedure accordingly.**
  - C. Wiesner commented that the test in the following sentence in the procedure should be made explicit: "If time allows, any leftover measurements from previous tests can be performed after ramp measurements are completed". M. D'Andrea commented that this refers to linear scans with secondary collimator catching the deflected halo, which are not required for this MD, but would be beneficial for the future. Similar scans have already been performed in the past. **J. Uythoven asked to add it in the procedure referencing to the previous tests. M. D'Andrea agreed.**
- MD9325 (Beam halo population measurements using collimator scans at the end of Squeeze) and MD9503 (Beam Tail population and diffusion measurements using collimator scans)
  - **C. Montanari confirmed that the operational beam and filling scheme at the time of the MD should be used. He will update the procedures accordingly.** He also agreed to combing the two MD requests in one End-of-Fill MD.
- MD9406 (Bunch by bunch tune shift measurements)
  - L. Giacomel confirmed that a standard 25 ns, i.e. non-hybrid, beam is requested with the highest number of bunches that are compatible with the heat load. X. Buffat commented that it will be less bunches then for the operationally used hybrid scheme. L. Mether agreed to provide the estimated number of bunches to the MD contact persons. **L. Giacomel will update the procedure with the beam type, filling scheme and total number of bunches.** G. Iadarola added that this MD is currently considered as spare MD.

- o L. Giacomel asked about the maximum number of bunches that can be kicked with the ADT. C Wiesner replied that the ADT excitation window is limited to 480 bunches (211th MPP). **L. Giacomel stated that the plan is to act on one bunch train and that it will be clarified in the procedure.**
- MD9545 (WS prototypes and operational system beam size measures comparison)
    - o C. Wiesner asked about the plans to use the wire scanners in view of the current limitations. A. Guerrero replied that it was recently confirmed that the existing issue concerns the wire scanners for the vertical plane. **Therefore, the MD plan consists in using the horizontal wire scanners (spare and operational ones for both beams). A. Guerrero confirmed that this will be clarified in the procedure.**
    - o C. Wiesner asked about the beam parameters desired for the MD. G. Iadarola remarked that the beam types and train lengths available from the injectors for the MD period have been defined, including trains of 72 bunches. He recommended the MD contact persons to choose one of these pre-defined settings. **A. Guerrero agreed to update the procedure with the beam parameters (number of bunches, emittances, bunch intensities).**

The MDs were approved understanding that the comments and modifications above will be included in the procedures.


# 3   MD9523: Threshold of longitudinal loss of Landau damping, and MD9525: Injection power transients with different RF settings (H. Timko)

- H. Timko confirmed that the requested maximum intensity for a single bunch for MD9523 is 3e11 protons. M. Solfaroli Camillocci commented that there is an interlock to protect the maximum dynamic range of the ADT, which is currently set to around 2.4e11 protons. **H. Timko will check with D. Valuch the actual interlock limit and whether the value comprises a fundamental limitation or can be adapted for the MD (ACTION).** D. Wollmann remarked that the hardware protection of the ADT is required but if the ADT colleagues confirm that this bunch intensity is acceptable, then he does not see a machine protection issue for going to 3e11 protons. No other issue concerning the use of a single bunch with this intensity at injection energy was raised. **J. Uythoven stressed that the roll-back of the ADT settings should be explicitly mentioned in the procedure.**
- H. Timko clarified that for MD9525 the injection of single batches with 72 bunches with up to 2e11 protons per bunch (ppb) is requested. She complemented that a maximum number of 1000 bunches was requested but is not absolutely necessary for the MD. **In view of the requested high bunch current, it was agreed to limit the number of bunches to 400. H. Timko will update the procedure accordingly.** J. Uythoven highlighted that also the feasibility of injecting trains with 2e11 ppb must be considered.
- J. Uythoven commented that the LMC might announce a general limit to the bunch intensity for operation. He stressed that for this MD, and for similar MDs, the number of bunches will be significantly lower than during physics operation, reducing beam-induced heating accordingly.

The MDs were approved understanding that the comments and modifications above will be included in the procedures.

## 4   MD6923: Slow beam degradation from incoherent electron cloud effects on the 3Qy resonance (K. Paraschou)

- K. Paraschou clarified that the number of bunches used will be 228 bunches per beam (i.e. 12b + 3x72b).
- **It was agreed that the TDIS should be retracted after the injection process has finished.**
- **K. Paraschou commented that he will include explicitly the required optics collimator sequence in the procedure.**
- K. Paraschou explained that the usage of the skew sextupole correctors in the Inner Triplets correctors (MCSSX) will induce beta-beating because of feed-down effects from the crossing scheme. He confirmed that the beta beating will be measured during the MD and the powering of the MCSSX will be limited such that the beta beat remains below 20%. **It was agreed that a maximum beta beat of 20% is acceptable.**
- M. Solfaroli Camillocci asked what power levels will be used for the MCSSX. He recalled that powering limitations exist for these circuits. **K. Paraschou will provide the values and update the procedure.**
- After the meeting, S. Redaelli commented on the effect of non-linearities on the loss patterns**. He proposed to perform a loss map for the configuration that will be tested with trains. The proposal was approved offline.**

The MD was approved understanding that the comments and modifications above will be included in the procedure.

## 5   MD6845: Instability measurements with varying bunch intensity (K. Paraschou, L. Mether, L. Sabato, S. Johannesson)

- K. Paraschou clarified that the maximum number of bunches used will be 300 per beam (with 72b trains) and that the requested bunch intensity is up to 1.8e11 ppb at injection energy. G. Iadarola commented that if the general plan for 2023 is to increase the bunch intensity to 1.8e11 ppb, then it's recommended to probe this during an MD to reduce the risk of finding surprises later.

The MD was approved understanding that the comments and modifications above will be included in the procedure.

# 6   MD9407: Noise spectrum and emittance growth with different ADT gain (G. Sterbini, S. Kostoglou, X. Buffat)

- X. Buffat confirmed that 80 INDIVs per beam with 8 bunches per injection and 2e11 ppb in collisions are requested for the MD. The high bunch current is required to achieve a high beam-beam tune shift. The bunch spacing is 525 ns.
- After the meeting, **A. Lechner confirmed that with a bunch spacing of 525 ns there is no issue expected for the beam-intercepting devices (TCDS, TCDQ, TDE).**
- X. Buffat detailed the different ADT masks to be applied. **He will update the procedure with the filling scheme, the different ADT masks to be used, and the roll-back of the ADT settings after the MD.**

The MD was approved understanding that the comments and modifications above will be included in the procedure.

J. Uythoven thanked all speakers and participants for the preparation and discussion and closed the meeting.

# 6   MD9407: Noise spectrum and emittance growth with different ADT gain (G. Sterbini, S. Kostoglou, X. Buffat)