

Present: Markus Zerlauth, Daniel Wollmann, Jan Uythoven, Kajetan, Christoph Schwick, Guido Sterbini, Wolfgang Bartmann, Stefano Redaelli, Stephane Fartoukh, Wolfgang HOFFLE, Elias Metral, Bjorn Hans Filip Lindstrom

The meeting aimed at a discussion and approval of the MDs classified as class 'C' by MP. The slides presented are available on the following Indico site:

<https://indico.cern.ch/event/734213/>, whereas the final MD schedule as well as all the detailed procedures can be found [here](#).

All MD procedures have been reviewed and the comments and rMPP classification have been set accordingly in the new ASM tool. Minor comments and clarifications for those not classified as Type C (and presented in the rMPP meeting) will be included in the 'Comment' field of the ASM tool and distributed until WED 06/06 to all MD requestors via mail. In addition, the EDMS approval for the MDs classified C will remain.

MD 2148 – ATS flat optics (S. Fartoukh) - Slides

- 2 shifts for the flat ATS optics are foreseen for MD1. A brief description of the different hypercycles is given. The crossing bump rotation is graphically illustrated, which is done with a beta* of 1 m, at flat top after a Xing angle reduction. This has already been exercised with pilots during the 2017 MD and appropriate corrections are fed forward to the 2018 exercise.
- In the first shift, the aim is to go through the complete cycle and perform optics measurements and correction at 60/15cm. In the second fill, also in the first shift, the aim is to perform aperture measurements at 65cm that is so far unexplored territory.
- In the second shift, the aim is to have 2 colliding nominal bunches + probes to perform TCT alignment, followed by a second fill for loss maps and asynchronous dump.
- At 60/15 cm, the TCDQ for b1/b2 will go to 7.1 / 7.8 sigma, compared to the nominal 7.3 / 7.3 sigma and to be compared to the IT aperture of ~9 sigma. The proposal is to further tighten the TCDQ at the end of the ramp by 219 um for b2 only, corresponding to 6.9 sigma at the end of ramp and 7.3 sigma at 15/60 cm (instead of 7.8 sigma).
- Stefano comments that a detailed aperture checks and validations will be required, which will be time consuming and it might not be possible to define the full validation plan (for future MDs at high intensity) on the fly. Stephane says that it is very likely that - due to the very ambitious plan for MD1 - not all the program can be completed and hence for MD2 some loss maps will need to be repeated/completed.
- Wolfgang mentioned that the tighter opening is not expected to be a problem with the limited beam intensity, also including some trains. The BETS functions are not foreseen to be changed compared to nominal operation. The (theoretical) margin of the BETS is 14 %, of which 6 % would be use by this additional shift under the assumptions that the limits are well centered around the beam. The only risk is that one might dump prematurely if this is not the case. It was agreed that one should start using the 'final' TCDQ functions for the flat optics.
Action: Wolfgang/ABT will verify that at the moment we are well centered at the TCDQ in position and also for the TCDQ BETS window.
Under these assumptions it was agreed to use the proposed TCDQ settings already from the very beginning for a representative validation.

- In the loss maps, no off-momentum loss maps are presently foreseen. Stefano suggests that depending on the aperture measurements, it remains to be defined which loss maps are finally required. Daniel proposes if also additional asynchronous dumps will be required, besides the one for the final optics. The phases between MKD and TCT are shown in slide 12; for beam 2 one is just above the allowed limit of 30 degrees by 2.5 degrees for the proposed telescope with a factor 4.
- Following a question from Wolfgang H., Stephane replied that ADT settings are prepared and ready to be used with the nominal bunches.
- **It was concluded that after this MD, the optics will not be ready yet for operation with trains, but another evaluation and possible additional loss maps will need to be done during MD2 to finalize the validation.**

MD 3297 – Heat Load Measurements with orbit bumps in the arcs (G. Iadarola) - Procedure

- Markus presents on behalf of Gianni. Four corrector orbit bumps are proposed at injection at various positions in the machine with an amplitude up to 4 mm to assess a potential effect on the measured heat load. In a given arc the bumps are always for one beam and in one plane only, to optimize on loss maps and also on MD results. Eight bumps per arc are foreseen for four arcs. Proposed beam intensity will be 800 – 900 bunches.
- Loss maps are foreseen with the bumps at 4 or 4.5 mm to gain some additional margins for the high intensity fill. Full set of loss maps at injection: including off-momentum and asynchronous dumps. Kajetan mentions that loss maps are done for a given pc interlock settings, for which tolerances can be opened to 4.5 mm.
Action: It is proposed to perform the loss maps at 4.5 mm. Kajetan will propose the pc interlocks to be used, alternatively Jorg proposed to use YASP interlocks which might be the more appropriate means for this purpose.
- Validation to be done in the beginning of the ‘heat-load’ MD period of 24 hours – to be validated during the 24 h MD block. If any doubt arises with or during the validation, the actual measurements at high intensity will be postponed to MD2.
- Stefano mentioned that it needs to be verified if the TCDQ still protects the machine aperture for the 4 mm bumps proposed.

MD 3349 – Start collision at 1 m beta* (K. Fuchsberger) - Slides

- Kajetan presents that a very similar MD was already done in 2017 for demonstration, but not enough time was available for the detailed set-up. In the 2018 MD, we also want to collide and separate again the beams at 1m. Two fills are planned. In first fill first go with nominal settings to 30 cm then step back to 1m (after setting new, fixed TCT interlock thresholds). In the second fill start to collide at 1 m, set the new TCT interlock thresholds and continue squeeze to 30cm.
- 2 – 3 nominal bunches are foreseen with masked collimator movement and TCT collimator limits set to a fixed value (as no segmented functions are possible). Last year, the TCT limits were set to parking for the 2017 MD. For 2018 a fixed value for these collimators at 1 m is requested from the collimation team. Stefano will consider if tighter limits than parking can be applied and will also consider the masking of the (beta*) interlocks on the collimator position.
Action: Kajetan will check with Daniele and let rMPP know the final agreement before the MD.

MD 3207- Proof of principle for UFO dynamics study during physics operations (B.Lindstrom) - Slides

- Bjorn presented some details of UFO studies proposed as End of Fill MDs (in fact, during the complete physics fills). An operational procedure for blowing up some bunches during normal

physics fills needs to be set-up. The aim is to blow 1 b horizontally and 1 b vertically in each beam (separated by at least 1 untouched bunch). If ok, aim for four bunches per plane (hor., ver.) and beam of the 12 b train, to increase the signal.

- Christoph will go and check with the experiments and feedback during the first tests, but the used bunches should be preferably at the end of the train.
- The triggering of the diamond BLMs on a loss pattern needs to be finalised – should be implemented this week - and the blow-up will need to be automated.
- Christoph will check that the bunches at the end of the train are most likely preferred by the experiment for the blow-up.
- The aim is putting this in operation after TS1, possibly during the intensity ramp-up.

Action: Bjorn will verify with D.Valuch if there are any limitations/restrictions that apply in the ADT to the blow-up of bunches in the first 12b train (which would require expert support).

MD 3263 - LR beam-beam compensation using DC wires 2018 (G.Sterbini) - [Slides](#)

- Guido focuses on the MP related aspects of the wire collimators MD. The collimator 5L1 is NOT a normal operational collimator, the other 3 wire collimator are normal operational collimators.
- B1 is the 'strong' beam with 158 bunches and B2 with 3 bunches plus pilots, while staying below a total intensity of $3e11$ p+. The pilots could possibly go unstable due to the reduced octupoles.
- The TCT-wire collimator is proposed to operate at 5.5 sigma with primaries at 5.0 sigma, as done in 2017.
- Q4/Q5 to be compensated to reduce local beta beating, for which PC interlock settings need to be opened up. Trims of up to almost 10 % of the quads are expected, requiring to open up the tolerance windows up to 20 %. Kajetan mentions that one should consider the phase changes due to the wire and due to the quadrupole trims, however as we correct back towards the nominal situation this should be fine. However, the effect of the trim of the quad without the wire should also be considered. **Action: Guido will follow-up on this.**
- A GUI will be used to synchronise the current setting of the wire and dipolar (small, within normal operation range) and quadrupolar corrections.
- The crossing angle reduction from 150 to 130 urad with the wires powered on is foreseen, while the distance of the wire to the beam should not change. For this, the non-operational collimator has been added to the normal operational tools used for crossing angle changes. **Action: As not used in 2017, this should be tested without beam after a normal operational dump, before the MD.**
- B2 blow-up will be supplied for the studies. Also, a scan of phase advance between IP1 and IP5 is foreseen, knobs have been prepared for this and tested in 2016 without the wires. A variation of +/- 10 degrees is proposed in x and +/- degrees in y, while keeping the total tune constant. This will result in a change of MKD – TCT phase advance of ~10 degrees for IP1 upon the nominal values of 177.4 and 155.1 degrees for IP1 and IP5 respectively. The effect on the beta beating is also shown.

Decision: OK to scan within +/- 15 degrees, to remain overall within 30 degrees MKD – TCT phase advance. A beta beat < 5 % is expected for the 15 degrees of phase change.

AOB
RAS.

Reported by J.Uythoven and M.Zerlauth