(r)MPP meeting: Approval of MDs for MD block#3 in September 2018 04/09/2018

Present: Markus Zerlauth, Jan Uythoven, Claudia Tambasco, Mathew Crouch, James Molson, Christoph Wiesner, Anton Lechner, Brian Petersen, Stephane Fartoukh, Roderik Bruce, Stefano Redaelli, Belen Salvachua, Wolfgang Hofle

The meeting aimed at a discussion and approval of the MDs classified as class 'C' by (r)MPP. The slides presented are available on the following Indico site:
https://indico.cern.ch/event/754600/, 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) have be included in the 'Comment' field of the ASM tool and will be distributed to all MD requestors via mail.

MD3292: Landau damping measurements by means of BTF – C.Tambasco (Slides)
The MD involves crossing angle scans at the end of the squeeze, performing BTF measurement at 8 – 9 sigma separation. As 60 urad of Xing angle is not a validated configuration, this will be achieved by using larger emittances of 2.5 – 2.0 um, using blow-up of the INDIVs from the injectors. During the MD one will only excite one INDIV at a time, while the ADT will be actively damping on all other bunches. Beam intensity will be 8 INDIVs on B1 and 8 trains of 48 nominal bunches in B2, with measurements being done only on B1. The minimum crossing angle will be 130 urad, which is updated from the original procedures (where it was 60 urad). No masking of PC interlocks is therefore required anymore. Jorg mentions that for the increased intensities, the blow-up of bunches might be easier done in the LHC with the ADT.

Decision: Approved with the modifications proposed above. Procedure to be update and uploaded to ASM.

MD4023: TCDQ levelling – S.Fartoukh (Slides)
Stephane explained the motivation of this first MD to maintain the beta* reach at 7TeV with LIU beams after LS2. For the high intensity beams, the TCDQ minimum gap will be around 5 mm against 3.7 mm at the moment. As the BETS currently prohibits any movement at top energy, the aim is to move the beam to the TCDQ (for the first MD at lower beam intensities), instead of the TCDQ to the beam. This would preserve the present beta* reach for the higher beam intensities in Run III. When the beam is moved by x towards the TCDQ, the goal is to move the non-critical TCSP jaw by 2x, keeping the beam centered in the TCSP.
The MD will be performed without the orchestration tool, which is not ready yet (as the TCSP cannot be controlled by the orchestration tool yet). The bump to be applied at the TCDQ is foreseen to reach up to 2 mm. A dedicated sequence is to be played in steps. The test will first be done with probes at injection, then with up to 2 nominals (+ several pilots for later validation), also at injection. The TCSP and the DOROS BPM interlocks will be automatically masked in SIS when using setup beam intensities (i.e. when forcing the SFB). The TCSP position interlock limit will need to be changed however, from 400 um to 5 mm. Stefano agrees that there is no problem with two nominal bunches at injection energy.
If time allows, Stephane would like to continue in MD4 at 6.5 TeV, complemented with loss maps.

Decision: Approved.

MD3270: ATS round optics with large tele-index – S.Fartoukh (Slides)

The aim is combined a ramp and double squeeze with collisions at 65 cm, with a tele-index of already 3 at the end of the energy ramp. The aim is to gain in octupole efficiency and to test electron cloud with trains up to 700 – 900 bunches.

The first MD shift aims to complete the loss maps. Full validation is foreseen with new TCT/TCL4 functions including two loss maps at collision with crossing angles of 120 urad and 90 urad. If all goes well this could be achieved in a single fill. As a second fill might however be required, it was agreed to:

- Swap the slots for the TCDQ levelling MD with the loss maps to allow for contingency if needed.
- Second MD shift for intensity ramp-up, where the following was proposed:
    - 1+12+144 =157 bunches, keep beam for 1 h for observation → rMPP proposes to use 1+12+48 = 61 bunches for the first fill
    - 1+12+3x144 = 455 bunches, keep beam for 1 h for observation → rMPP proposes to use 1+12+2x 144 = 311 bunches
    - 1+12+6x144 = 877 bunches, keep beam for 2 h for observation→ rMPP proposes to use 1+12+5x144 = 733 bunches

The MD also foresees a test with positive octupole, which is considered safer. However, negative octupole polarity will finally be needed to preserve lifetime. The proposal was to finish the first fill with the off-set levelling test and finish with negative octupole polarity, which can then be fed-forward to fill 2 and 3 if successful.

Decision: The proposed intensity ramp-up, with fewer bunches, was finally accepted. The luminosity off-set levelling test will be performed in the second intensity step. Procedure to be update and uploaded to ASM.

MD 3328: Injection with collimators at 3 sigma and tight cold aperture – R.Bruce (Slides)

The MD is of interest for the tight apertures at injection, foreseen for machines like FCC and HE-LHC. The main aim of the MD is therefore to study collimator losses in IR7, not injection studies, impedance and instabilities and aperture measurements.

The detailed steps to be taken during the MD are as follows:

- After nominal injection steering, close the collimators in steps of 0.5 sigma down to 3.2 sigma, and inject pilot, observing collimator losses, stability and beam lifetime
- Blow out each pilot with ADT for loss-maps
- Repeat with 1 nominal
- Repeat with trains of 12 – 48 bunches

Injection will therefore happen with the ring collimators at tighter settings than nominal (as long as losses in IR7 remain acceptable), while keeping injection collimators at standard settings. MD on 1 beam only.

Belen mentions that B1 creates losses at TDI and IP7, while for B2 we only observe losses in B2, so B2 is more interesting.

If time is still available at the end of the MD, an option to apply a bump in the arc to achieve an arc aperture of 9 – 10 sigma was proposed. If successful, one would repeat the measurements above, starting with a pilot but only up to 1 nominal bunch. Jorg proposes to use a 3-corrector bump instead of a 4-corrector one at a chosen location. However, the aim is to inject with the bump on. This is OK if done in a few steps, also checking injection with the increasing bump amplitude.

Decision: Approved with the modifications proposed above. Procedure to be update once the remaining details are clarified and uploaded to ASM.

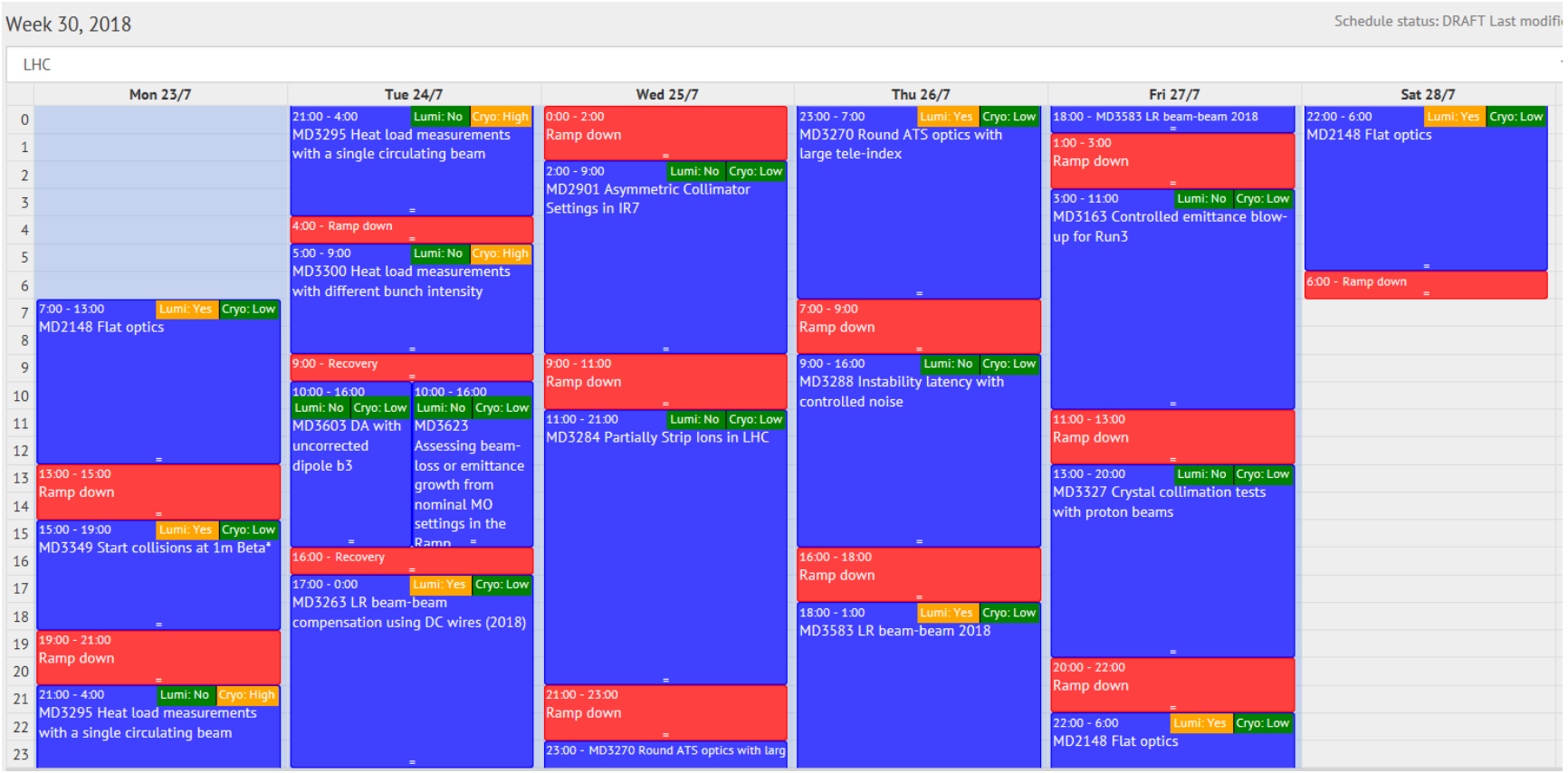
MD 4044: ASD dump test with bunched beam at flat top – C.Wiesner (Slides)
This MD is a continuation of previous measurements to understand the quench behavior and margins as well as the BLM signals in the dump region during regular operation 9and beam dumps). Two buckets were measured previously in MD2930. The aim is to measure at least 3 more buckets (around the already measured points) while limiting the risk of quenching due to the use of a single pilots of 5e9 p+ (which is a factor 3 below the intensity that quenched the Q5 during the first tests).
Start the MD by setting up the MKI fine delay and probe the AG at injection first with up to 15 reference measurements, checking the reproducibility (new, procedure to be updated). Then, perform 3 fills always ending with an asynchronous dump and revalidate with beam the MKI settings at the end of the MD. In case of a quench, the full validation will have to be done during the restart after TS2. The roll-back of the settings will be done anyway at the end of the MD, irrespective of its outcome.

Decision: Approved.

MD 2733: BI MD on bunch size measurements with DOROS BPMs
Decision: This MD will be treated off-line as no representative was present. The BI team is in contact with the collimation team to define the collimator settings and details of the bump.

AOB
RAS.

Reported by J.Uythoven and M.Zerlauth


Week 30, 2018
Schedule status: DRAFT Last modifi
LHC
Mon 23/7
Tue 24/7
Wed 25/7
Thu 26/7
Fri 27/7
Sat 28/7
7:00 - 13:00 Lumi: Yes Cryo: Low MD2148 Flat optics
13:00 - 15:00 Ramp down
15:00 - 19:00 Lumi: Yes Cryo: Low MD3349 Start collisions at 1m Beta*
19:00 - 21:00 Ramp down
21:00 - 4:00 Lumi: No Cryo: High MD3295 Heat load measurements with a single circulating beam
21:00 - 4:00 Lumi: No Cryo: High MD3295 Heat load measurements with a single circulating beam
4:00 - Ramp down
5:00 - 9:00 Lumi: No Cryo: High MD3300 Heat load measurements with different bunch intensity
9:00 - Recovery
10:00 - 16:00 Lumi: No Cryo: Low MD3603 DA with uncorrected dipole b3
10:00 - 16:00 Lumi: No Cryo: Low MD3623 Assessing beam-loss or emittance growth from nominal MO settings in the Ramp
16:00 - Recovery
17:00 - 0:00 Lumi: Yes Cryo: Low MD3263 LR beam-beam compensation using DC wires (2018)
0:00 - 2:00 Ramp down
2:00 - 9:00 Lumi: No Cryo: Low MD2901 Asymmetric Collimator Settings in IR7
9:00 - 11:00 Ramp down
11:00 - 21:00 Lumi: No Cryo: Low MD3284 Partially Strip Ions in LHC
21:00 - 23:00 Ramp down
23:00 - MD3270 Round ATS optics with larg
23:00 - 7:00 Lumi: Yes Cryo: Low MD3270 Round ATS optics with large tele-index
7:00 - 9:00 Ramp down
9:00 - 16:00 Lumi: No Cryo: Low MD3288 Instability latency with controlled noise
16:00 - 18:00 Ramp down
18:00 - 1:00 Lumi: Yes Cryo: Low MD3583 LR beam-beam 2018
18:00 - MD3583 LR beam-beam 2018
1:00 - 3:00 Ramp down
3:00 - 11:00 Lumi: No Cryo: Low MD3163 Controlled emittance blow-up for Run3
11:00 - 13:00 Ramp down
13:00 - 20:00 Lumi: No Cryo: Low MD3327 Crystal collimation tests with proton beams
20:00 - 22:00 Ramp down
22:00 - 6:00 Lumi: Yes Cryo: Low MD2148 Flat optics
22:00 - 6:00 Lumi: Yes Cryo: Low MD2148 Flat optics
6:00 - Ramp down