

Present: Daniel Wollmann, Jorg Wenninger, Jan Uythoven, Christoph Wiesner, Brian Petersen, Roderik Bruce, Wolfgang Hofle, Sofia Kostonglou, Guido Sterbini, Matthieu Valette, Giovanni Iadarola, Chiara Bracco, Axel Poyet, Hugues Thiessen, Yannis Papaphilippou

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/765240/>, whereas the final MD schedule as well as all the detailed procedures can be found [here](#). It has been requested to update the presented MD procedures following this meeting, after which they will be stored in edms.

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 will be included in the 'Comment' field of the ASM tool and will be distributed to all MD requestors via mail before the MD4 period.

#### **MD4147 50 Hz harmonics perturbation studies**

Several tests with 1 indiv + 12b +3x48 b at injection have been proposed to investigate the 50 Hz harmonics perturbation on the beam spectrum. The first test foresees an excitation by the ADT up to  $0.1 \sigma$ . Wolfgang mentioned this maximum amplitude was discussed with Daniel. It was agreed that the proposed test is fine as long as one starts with small kick values tested on 1 indiv. If this is fine, the same kick can be applied to the 3 x 48 b.

The second test proposed concerns a phase scan between IP1 and IP5 at injection. MKD – TCT phase advance was studied but is generally not a limit at injection energy, so the test can be performed as proposed. The third test proposed concerns injection of controlled noise on a RB power converter: Reiner Denz commented before the meeting his serious worries concerning the filters used for quench protection which are highly optimized. Any changes would need several days of verifications, to guarantee no massive quenches. Also the modification of any other, even warm, power converter was rejected.

**Decision:** The first two tests can be performed as proposed, with the mention that the proposed excitation by the ADT should first be tested on an indiv bunch. The third test, requiring the injection of controlled noise in any power converter, was rejected.

#### **MD3263 LR beam-beam compensation using DC wires**

Many of the required pre-tests have already been done, two tests are outstanding: check of the polarity of the wires and the feed-forward orchestration of tune correction. Both will be performed at the beginning of the MD.

For the first time, the wires will be used on a beam consisting of a train of 3 x 48 bunches. It was decided to stick to  $\beta^* = 30$  cm. The effect of a trip of the PC of the wire was studied in details giving the tune shifts of 0.009 max. Beta beat up to 12 % as worst case. All was found acceptable. Roderik feels confident, losing 0.3 – 0.4 sigma margin in collimation is acceptable.

A discussion took place what to do if the wire pc trips? The recommendation is to trim back the Q4 and the Q5, via trim history.

Jorg recalled that the interlock limits of quadrupoles need to be opened, not to be forgotten and to always be sure to have some margin.

At the end of the MD, 50 Hz noise studies can be performed by de-activating the active filters, one sector at a time.

**Decision:** The MD is approved as proposed.

**MD3205 beam screen shielding for QH discharge.**

The magnet chosen magnet for the MD is preferred because of existing reference data from previous quenches (MB.C28L5). First test in the ramp at 3.5 TeV, second at 6.5 TeV is proposed. The two additional quenches of this magnet were approved by MP3 on August 29th. Beam screen warm up approved by VSC, to start in the afternoon before the MD. Expect kick of 0.5 sigma and 0.1 sigma respectively.

**Decision:** The MD is approved as proposed.

**MD2186 New method to measure margins between IP6 absorbers and TCTs.**

A closed orbit bump bump on B2 between the TCDQ and TCTPH.IP5, at  $\beta^* = 30$  cm, 160 urad, is proposed. The initial bump amplitude is 2.2 sigma. The orbit feedback should be disabled BEFORE applying the bump. The bump could be closed manually with orbit feedback if the operator knows how, to be checked offline. Move in TCTs until losses are seen. Test 2 proposes a retracted TCDQ. TCDQ movement out is expected to be OK, as it is a large step (Chiara). The third test with nominal position and blow-up of the third pilot is foreseen. This will need the opening of the primary collimators, as one needs to be sure that the TCDQ and TCT's are primaries. Roderik agrees that the primaries can be opened by 2 – 3 sigma if losses on primaries seen. Roderik advises somebody from collimation to be there.

**Decision:** No machine protection risk was identified, but some practical hints and suggestions for further preparation were given.

**MD4203 Heat load measurements with high intensity 12b trains.**

It was demanded to have at stop in the filling at 480 + 12 b and check on the heating (20 minutes or so). For the expected bunch intensity of  $2.0e11$  p+/b the ADT is expected to operate correctly and also the BQM should be functional (Wolfgang). The TCDIs should be below the operational limit with trains of 3 x 48 bunches.

The physics measurements in the following MD, declaring Stable Beams, are to be done with 2 trains of 12 bunches plus 1 – 2 indivs, using a  $\beta^*$  of 30 cm.

**Decision:** During the filling a check on beam heating should be made at 480 + 12 b. Physics with 12 b trains to be done with 2 trains of 12 per beam at a  $\beta^*$  of 30 cm.

**MD2484: Electron cloud with high intensity 8b4e beams**

**Related MDs: MD32770 (ATS round), MD3246 (UFO) and MD4507 (Emittance evolution)**

If the new ATS optics poses any problems, the MD will be performed with standard ATS optics, as used for physics. One is planning for  $1.7e$  p+/b, previous measurements were done with  $1.55e11$  p+/b. All measurements to be done at  $\beta^* = 30$  cm.

Two fills, with 876 and 1812 bunches, are proposed in the second block. Adjustments to the machine listed; Helga thinks of changing functions of the blow-up, following observations in earlier fills. UFO measurements can be done in //, blow-up on the 3x12 b, non-colliding. Max blow-up to 4 um.

Intensity ramp-up:

Loss-maps are to be made in the ATS MD32770 and have been agreed with Alessio. The 12 b fill should be done following the loss maps and can be done without detailed loss maps analysis, however it requires a global OK. If due to time constraints the 12 b fill cannot be done, the second MD slot on Friday can start directly with the 150 b, as foreseen.

If the 8b4e tests will be done with the standard ATS optics, it will need the 150 b fill as first step of the intensity ramp up.

Parallel UFO studies at the very end of the MD to provoke UFOs if not already present, solenoid off and blow-up more bunches, were approved (not in collision)

**Decision:** The tests can be performed as proposed. The 12 b fill in the first block is recommended both for the intensity ramp and to be able to perform the planned emittance measurements during the ramp. In case of a lack of time it can be omitted before taken 150 bunches per beam in the second block. If one switches over to the nominal ATS optics, the intensity ramp up will need to start at 150 b / beam.

Reported by J.Uythoven