(r)MPP meeting: Approval of MDs for MD block#1 and #2 in 2017

Present: J. Uythoven, M.Zerlauth, D.Wollmann, J.Wenninger, C. Schwick, G.Sterbini, A.Apollonio, M.Valette, L. Carver, Y. Papaphilippou, E.B. Holzer, A. Mereghetti, W.Hofle

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/649038/

J.Uythoven presented an overview of the comments given by the MP experts for the different MDs, which can be found here.

The following MDs were classified as class A or B without particular concerns for MP, however a few questions concerning the practical aspects and organization of the MD were made as follows:

MD#2042 (RF - persistent injection oscillations): The MD foresees non-standard emittances and is planned overnight – injectors and EICs on shift should be instructed/warned early on.

MD#2155 (Impact of ADT on beam quality): The planning is very optimistic, again using special beams. The request for beam separation (2 sigma total or per beam) should be clarified.

MD#2177 (Crystal collimation): MD class C, but as already done with identical procedure on the other beam in 2016 no request for dedicated presentation during today's meeting. Details on additional linear scan with TCT were included in the procedures after the meeting by the collimation team and approved by MPP.

MD#2269 (ATS non-flat): Only with pilot beams so no issue for this first test, to be discussed once MD request for higher intensities.

MD#2065 and #2066 (Emittance exchange with linear coupling): Guido S. clarified the procedure of this MD, which would only use the 144b train in for the first ramp (with lower octupole setttings). The emittance exchange part (and the wire scans) will be done only with 1-2 single nominals. First, a setup at injection will be done as last time no emittance exchange was seen (but was using round beams).

MD#2154 (PPLP fast ramp): New ramp with pilots only, coarse collimator settings. No major issue.

MD#2158 (B4 correction and feed down): Similar to commissioning, pilots only.

MD#2180 (Beta* reach, aperture): As ATS only done with pilots for the time being, more consequent preparation and validation needed once done with nominal bunches.

MD#2197 (BTF): Class C but done in identical way before.

Several spare MDs have been prepared, at this moment in time two MDs are retained as spare MDs for MD#1 and MD#2, namely MD#2050 (RF controlled emittance blowup) and MD#2157 (Beam quality preservation) and no machine protection issue was identified for these MDs.

The following MDs were classified as type C and discussed in more detail during the meeting:

MD#2036 (UFO with wire scanners)
A. Apollonio recalled the UFOs to be one of the big unknowns that require additional investigations of their dynamics to confirm and validate the modelling and simulation of the UFO events observed in the machine. The main aim of the MD is to monitor losses produced by elastically scattered particles at the TCP with the diamond BLMs in IP7. Using diamond BLMs in a more frequent basis is also a very useful mid-/long-term addition to the future MPS system architecture.
J. Wenninger asked why the transversal displacement is done with a complicated ADT setup, creating global bump rather than using a local orbit bump. In case of a global orbit change the dBLM signal will be a mixture between local scraping and orbit bump at TCP.
D. Wollmann replied that the ADT will allow to displace only a single bunch and observe the signal differences with respect to the non-displaced bunches. It will be ensured that the losses due to the displacement of the bunch have decayed, before the wire scanners is used.
The ADT settings for the expected displacements are derived from previous measurements, the excitation will be gated to a single bunch.

MD#2193 (TCPSM – collimator impedance)
Aims at estimating the impedance of the newly installed low-impedance collimator TCSPM.D4R7.
The MD is done at flat top only (no squeeze), using ADT kicks in AC-dipole mode and moving the TCSPM to 5 sigma half-gap (and open) to measure the tune-shifts (increasing octupole currents).
Suggestion to close primaries before moving in the TCSPM (inverting steps 8 and 9 in procedure) unless there are major concerns about the impedance increase.

MD#2201 and MD#2202 (LR beam-beam compensation by wire)**:**
MD program acknowledged to be very optimistic, all items mentioned in the procedure as 'if time allows' are not part of the base plan for this MD.
Fill 1: TCT to 6 sigma will only happen with setup beam with <3 nominal bunches with the TCPs at 5 sigma. This will require an asymmetric filling scheme, the details of which will be added to procedure.
Fill 2: symmetric filling scheme might not take place.
The hardware interlock on wire will be tested before the MD, e.g. during the recovery from the previous MD.
B2 Xing change: knob is not commissioned, but J. Wenninger confirmed that it is a standard knob, however, there will most likely not be time for this one to be done. J. Wenninger is confident in the correctness of the knob, therefore no commissioning with safe beam is required ahead of the MD (The knob can be simulated in YASP to cross-check, which was already done by Matteo). Jorg commented that this will change the overall crossing angle as well. However, most of the effect is expected on B2.

The blow-up will first be done on individual bunches, only later on other bunches? It needs to be kept in mind that the ADT can only blow-up single bunches at the time (unless the ADT expert is present). The missing details will be added to the procedure.

MD#1828 (Non-working dump trigger):
Verifying the feasibility of scraping away the entire beam in case of non-working dump trigger. This first MD will be entirely done at injection energy, first injecting a train of 12b in B1, correcting the orbit and then turn OFB off (in order to avoid corrections towards a wrong reference once the bunch intensity decreases). Jorg mentioned that normally at injection orbit feedback is off anyaway.
Then scrape all bunches by maintaining a ~30 minutes lifetime with ADT white noise excitation in H plane. Closely monitor the orbit and damping when intensity becomes lower than 5e10p. In the following repeat with a 144b train.
W.Hofle questioned whether for the procedure a scraping with the primary collimators would not be the safer approach, as an ADT blow-up will be non-revertible (in terms of transversal emmitance).

MD#2183 (Calibration of dBLMs at TCDs):
The procedure is very similar to an MD already done in 2016, injecting pilots up to small nominals on the TCDQ with various impact parameters using a growing bump. Collimators in IP6 will be set to top energy settings, IR3 collimators displaced against each other to assure no beam passage will be possible. For the injection of (small) nominal bunches a change of the probe beam flag in the SPS has to be done – the EIC (or Markus/Jorg) have the necessary RBAC role to do this.
It needs to be verified with N. Magnin how the related XPOC module masking can be done.

Miscellaneous
J. Wenninger mentioned a request from the LMC to start the preparation of a beta* levelling test for the end of the year. This might require to submit an MD request (seems already done, see MD request 2427).

Reported by J.Uythoven and M.Zerlauth