

Wire MD: Initial Brainstorming

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This note summarises the discussion that took place on the 21st of March 2018 about the planning of the wires MD in 2018.

The slides are available on Indico:

<https://indico.cern.ch/event/706919> (<https://indico.cern.ch/event/706919>)

As a reminder, the two main goals of the wire MDs 2018 are:

1. to test the 2 IRs compensation with round optics, down to 5 sigma collimation setting of TCTW (this configuration was discussed and approved last year but could not be tested);
2. then to move from safe beams towards trains.

During the commissioning, optics with a β^* pushed to 25/27 cm will be tested.

Yannis commented that lower β^* at constant normalized separation is more favourable for the MD program. **Guido** added that all the results shown in the slides refers to $\beta^* = 30$ cm.

ACTION for **Guido** and **Axel**: prepare the dimensioning of the wire compensation for $\beta^* = 25/27$ cm.

In IP1, the wires follow the collimation convention: a vertical wire on the "right" jaw is on top. **Guido** recalled that the connected wire in the right collimator of IP1 is on the "right" jaw therefore to compensate a positive vertical crossing angle for B1 in IP1 (as chosen for 2018).

In IR1 due to specific integration issues, the wires are not in an optimal position and, in addition, they are not positioned symmetrically with respect to the IP.

During beam commissioning

Stefano informed that discussions are still on going for the tertiary settings: the investigated range is between 7.5 and 8.5 and σ_{coll} (as in 2017). **Stefano** pointed out that in MD (with SAFE BEAM) this is not critical. **Guido** agreed but commented that for end-of-fill having the TCTPH/V closer to the beam will be very beneficial for the compensation. **Guido** added that the settings of the TCLV (this is not an operational collimator) has to be clarified.

Stefano proposed to not include the TCLV in the operational collimator sequence. Since it is a vertical collimator (reduced risk in case of asynchronous dump), a possible operational configuration at top energy could be $15 \sigma_{coll}$.

ACTION for **Stefano**: clarify setting of the TCLV at top energy.

During the year (ramp-up after TS), one could make loss maps and asynchronous dump tests for a more aggressive configuration to be used for a possible EoF MD. If time allows, **Stefano** commented that some loss maps can be also performed during the beam commissioning.

Stefano commented that the motion of the TCLV during the crossing angle scan should not difficult to be included during the MD (SAFE BEAM) by modifying the configuration of the lumi-server. During normal operation instead, a part from the overhead for including the TCLV in the standard sequence, iterations with Alpha and Roman Pots would be necessary, since they already complain about the TCL standard settings.

Stefano said that Collimation will include the TCLV in the collimation commissioning including loss maps at $15\sigma_{coll}$.

ACTION for **Stefano**: will check with Rodrik the TCTW's phase advance and minimum settings during EoF plus define tests to be done (loss maps or async dump) to validate those settings.

ACTION for **Guido**: contact Michi for to include in the lumi/xing angle server configuration (during MD with SAFE BEAM) the TCLV.

Concerning the possibility to maintain the settings of the wire-beam alignment (top energy, CMS offset on) for the full run, it seems reasonable but **Stefano** will check with the HW experts.

ACTION for **Stefano**: verify if we can align the 5-th axis for the top energy wire configuration, and check that we can operate with the collimator jaws in the offset position.

Stefano reported that the present way dBLM data are stored seems convenient. **Guido** (as an MD user and not a dBLM specialist) pointed out that we should make an effort to use, if possible, the standard database (CALs). After discussion, it was agreed to explore the possibility to store the dBLM histograms in CALs. **Rodri** suggested to log the histogram at 1 Hz and re-bin the information with 1 point/bunch.

ACTION for **Guido**: contact Belen and Arek to ask/discuss about the logging in CALs of the dBLM.

Before MD1

- About the feedforwards, **Mirko** confirmed that they will help on that (+GUI). No show-stoppers are expected to program the feedforward to be a function of the wire current, I_W , and beam-wire distance, d_W (presently the d_W is a static parameter not an online callback).

I have still few doubts on the feedforwards. If the power supply is not in idle and the jaws start to move, as non-expert I do see a problem.

—  Guido

- The PU data of the TCLV are not yet available in CALs.

ACTION for **Adriana**: follow-up of the TCLV PU CALs logging, and recheck with **Nuria** the correspondance of left/right jaw in "collimation convention" with the Top/Bottom in our convention.

MD1

- Using the excitation with the damper, a tune measurement with a pilot seems possible. **Rodri** suggested to check it during beam commissioning.
- With the Schottky, BI does not ensure any results at flat top with a pilot. **Yannis**

suggested to gate the Schottky on the different bunches to make comparisons.

ACTION for **Adriana**: validate the Q-precision with a pilot excited with the damper (during LHC commissioning).

MD2

- **Stefano** informed that moving the jaws when the wire is ON is not a problem.

MD3

- Before MD3, BI has been asked to reconfigure the wires and put them in series (with current flowing in the same direction in both wires).

We need an ECR for that, and before check feasibility.

EoF

The possibilities to connect the wire in series has still to be validated. **Adriana** is working on this point and in principle the connection can be done on the PC side (the 2x voltage drop increase is compatible with the PC). Probably special connections interfaces need to be produced. **Guido** pointed out that some checks on heating and mechanical forces between the wires should be done.

ACTION for **Adriana**: check that putting the wires in series is possible:

- Power Converter enough.
 - Change of cabling at PC or at collimator junction box (see with RP if possible during short shut-down)
 - Heating of wires?
 - Forces attracting wires?
 - If ok write ECR.
- During the Eof MD, if one need the Q4 feedforward, one need a strategy to allow this trim and masking the interlock for all PC cannot be consider a valid strategy. **Mirko** will discuss this point with **Jorg**. The question of feedforward

has therefore be studied and eventually limit the I_W to the allowed tolerance of the Q4 trim.

ACTION for **Mirko**: follow-up of strategies to use Q4 trims in UNSAFE BEAM.

MD4

Two options are still on the table and a decision will come later depending on the results of MD1, 2 and 3.

The next meeting will be organized between around the 15 of April.