



“Collimation Update” talk at the LHC Performance Workshop, Chamonix 2018

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21/12/2017

Syllabus

- Update of the baseline
- Implications of the 2017 LHC MD results on the installation of low-impedance (baseline) and Crystal (option) collimators for the HL-LHC.
- Implication of 2017 HiRadMat test of low-impedance and rad-damage test: can we freeze the design of low impedance collimators?
- Discussions for potential operation modes / tests in the LHC after YETS 2017/2018.

Baseline status

- **LS2 plans**
 - 2 DS collimators around IR7 with 11T dipoles
 - 2 DS collimators around IR2 without 11T dipoles
 - 8 low-impedance secondary collimators in IR7
- **LS3 plans**
 - Completion of IR7 low-impedance upgrade
 - IR collimation: new tertiary collimators
 - IR collimation: physics debris
- **Not in the baseline yet**
 - Crystal collimation for ions (LS2?)
 - Hollow electron lenses (LS3)

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Should I mention that ongoing optimization of collimator design for IRs (issue TAN region)?

Towards implementation of LS2 baseline

- Key achievements on hardware side in 2017
 - Completion of 1 prototype installed in the LHC
 - One conform TCLD prototype
 - *New wire collimators (option)*
- Recall important work on contract preparation
 - Thanks to teams involved.
 - Credible schedule for LS2 collimators
- Recall works done together with other WPs?
 - IR7: passive protection with new MQW config
 - Some highlight from WP11 on cryo by-pass
 - ...

Outcome of 2017 collimation MDs

- Very important results from HL hardware tests in LHC
 - Key HL design choices validated
- Low impedance collimator prototype
 - Experimental demonstration of the improvement !
 - Models confirmed by measurements: keep baseline
- Review highlights of results from HiRadMat / BNL
 - Show that we have no show-stoppers found so far.
- Crystal collimation
 - First results showing consistently a cleaning improvement for ion beams, during Xe MD!
 - Recall plans for MDs in 2018; possible LS2 action plan.
- Similar to what I presented to the Madrid meeting

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 - Crystal collimation
 - First results for ion beam
 - Recall point
 - Similar to v
- *The TCSPM design IS frozen for the LS2 upgrade.*
 - *Check point on new company that produces MoGr*
 - *In case of issue with pre-series, backup ready*
 - *Possibility to refine further the design of TCSPM for LS3. Challenge: dynamics deformation for HL design losses with 0.2h lifetime*

More studies for 2018 (core only)

- Refine understanding of proton quench limits
 - feedback to the performance of 1-TCLD layouts for IR7
- Low impedance collimator prototype — continue understanding
 - Repeat impedance measurements, pushed beam
 - Ambitious plan to assess coating robustness against circulating beam losses.
- Preparing tests of crystal collimation for Pb to the maximum extend!
 - Aim at possibly using them as end of fill in ion run.
- New tests at BNL with coated samples
 - Timeline critical for production, though
- Continue understanding of tail population and halos
- **Beam tests at RHIC with hollow beams for collimation.**

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- See list of 2018 MD above