International Review of the HL-LHC Collimation System

Report of Contributions

https://indico.cern.ch/e/780182

Contribution ID: **1** Type: **not specified**

Welcome, introduction and mandate

Monday 11 February 2019 08:45 (15 minutes)

- Detailed introduction of upgrade plans
- Review of HL-LHC parameters
- Brightness frontier in Run III following LIU upgrade

Presenter: BRUNING, Oliver (CERN)

Session Classification: Introductory Session

Contribution ID: **2** Type: **not specified**

Collimation upgrade plans

Monday 11 February 2019 09:00 (30 minutes)

- Detailed introduction of upgrade plans
- Definition of timeline for the WP5 upgrade: LS2 and LS3 plans
- Recap. of the planned consolidation activities, impacts for the HL goals
- Introduce the new design features relevant for HL: BPM collimators, new jaw design
- Recap. status and plans for hollow e-lenses and crystals
- Recap. of the last technical review for HL-LHC at Chamonix 2018 for collimation

Presenter: REDAELLI, Stefano (CERN)

Session Classification: Introductory Session

Contribution ID: **3** Type: **not specified**

Close-out

Tuesday 12 February 2019 16:00 (1 hour)

Contribution ID: **4** Type: **not specified**

Overview of present collimation performance (20+10)

Monday 11 February 2019 09:30 (30 minutes)

- Evolution of settings and protected aperture for small beta*
- Cleaning performance throughout the years
- Performance of IR cleaning (incoming and outgoing)
- Relevant system faults and HL-LHC protected aperture
- System failures, availability and sources of downtime
- Review of beam loss cases inducing damage

Presenter: BRUCE, Roderik (CERN)

Session Classification: Session 1: Review of the operational experience in Run I and Run II

Contribution ID: **5** Type: **not specified**

Beam losses, lifetime and operational experience at 6.5 TeV (20+10)

Monday 11 February 2019 10:00 (30 minutes)

- Review beam losses and lifetime for protons and ions
- Stability and reproducibility: collimation settings
- Stability and reproducibility: orbit and optics
- Tail population measurements
- Experience with beam failures damaging the collimator

Presenter: SALVACHUA FERRANDO, Belen Maria (CERN)

Session Classification: Session 1: Review of the operational experience in Run I and Run II

Contribution ID: **6** Type: **not specified**

Performance of new designs deployed in Run II and plans for Run III (20+10)

Monday 11 February 2019 10:30 (30 minutes)

- New jaw design and performance of BPM collimators
- Operational performance of the TCSPM prototype in 2017-2018
- Software improvements and performance in Run II: alignment and BPM interlocks (including machine learning)
- Prospect for further improvements, including machine learning
- Recap. of Run III layouts

Presenter: MEREGHETTI, Alessio (CERN)

Session Classification: Session 1: Review of the operational experience in Run I and Run II

Contribution ID: **7** Type: **not specified**

Cleaning upgrades in the dispersion suppressors (20+10)

Monday 11 February 2019 11:30 (30 minutes)

- Review technical solutions for DS around IR7 and IR2
- Studies of different locations for IR7 and final layouts
- TCLD design: settings and material choices. Functional specifications
- Review key/critical points in the ECR (installation, safety, transport⋯)

Presenter: LECHNER, Anton (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **8** Type: **not specified**

Quench performance and assumptions: simulations and beam tests (20+10)

Monday 11 February 2019 12:00 (30 minutes)

- Collimation quench tests with protons: can we quench with proton beams?
- Collimation quench tests with ions and BFPP quench tests
- Benchmark of simulations: peak energy deposition for the different test

Presenter: SKORDIS, Eleftherios (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **9** Type: **not specified**

Quench performance and assumptions: magnets and cryogenics (20+10)

Monday 11 February 2019 12:30 (30 minutes)

- Quench limits and possible limitations from cryogenics
- Status of cryogenics limitations for different loss scenarios
- Comparison of present dipole and 11T dipole

Presenter: BOTTURA, Luca (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **10** Type: **not specified**

Operational experience with ions (20+10)

Monday 11 February 2019 14:00 (30 minutes)

- Review of relevant aspects in ions runs
- Plans for bumps in different IRs: IR1/5 without TCLD and IR2 with TCLD (without 11T)
- Are the bump solutions robust enough for the HL-LHC
- Luminosity reach with the present upgrade scenarios
- Brief highlights from the crystal collimation tests with ion beams during Run 2

Presenter: FUSTER MARTINEZ, Nuria (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **11** Type: **not specified**

Status of 11T dipole project (20+10)

Monday 11 February 2019 14:30 (30 minutes)

- Overview talk from WP11: where we are and what are the plans for LS2
- Final configuration of cold masses and corrector package in new locations
- Summary of LS2's ECRs

Presenter: SAVARY, Frederic (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **12** Type: **not specified**

Impedance models, operational experience and expected limitations (20+10)

Monday 11 February 2019 15:00 (30 minutes)

- IR7 upgrade plans in LS2 and LS3
- Experience from Run I and Run II
- Expectations for HL-LHC
- Review of beam tests with the low-impedance prototype
- Other mitigation options for impedance issues (new optics, asymmetric settings, new ATS) and drawbacks: theory and beam test results

Presenter: METRAL, Elias (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **13** Type: **not specified**

IR collimation upgrades –incoming beam (20+10)

Monday 11 February 2019 15:30 (30 minutes)

- Layout for new IR1 and IR5
- Protected aperture and baseline settings
- Proposed material choices and their performance

Presenters: GARCIA MORALES, Hector (Royal Holloway University of London (RHUL)); BRUCE, Roderik (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **14** Type: **not specified**

IR collimation upgrades –outgoing beam (20+10)

Monday 11 February 2019 16:30 (30 minutes)

- Layout for new IR1 and IR5: TCLs and masks
- DS losses at high luminosity: any limitations for proton operations?
- Status of mask specifications

Presenter: CERUTTI, Francesco (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **15** Type: **not specified**

Plans and goals for remote alignment and impact on collimator designs (20+10)

Monday 11 February 2019 17:00 (30 minutes)

- Overview of the overall plans, with specific aspects for WP5
- Review tolerances and specifications
- Timeline for critical decision points

Presenter: FESSIA, Paolo (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **16** Type: **not specified**

Review of hollow e-lenses (20+10)

Monday 11 February 2019 17:30 (30 minutes)

- Recap. previous reviews and status of baseline process
- Design overview: where we are
- Status of process for insertion into baseline

Presenter: ROSSI, Adriana (CERN)

Session Classification: Session 2: Upgrade plans - performance and needs

Contribution ID: **17** Type: **not specified**

Status of LS2 production and prospect for LS3 (20+10)

Tuesday 12 February 2019 08:30 (30 minutes)

- Review where we are: status of ongoing production for LS2
- Recap. of experience of LS1 production:
- Plans for future productions: what can we expect for LS3.
- Comments on the prospect for in-kind contributions

Presenter: LAMAS GARCIA, Inigo (CERN)

Session Classification: Session 3: Specific design aspects and production status

Contribution ID: **18** Type: **not specified**

Performance of new HL collimator designs (20+10)

Tuesday 12 February 2019 09:00 (30 minutes)

- Status of collimator design. New collimators for IR cleaning
- Summary of potential failure scenarios and resulting beam impact on the collimator jaws
- Experience without beam with the prototypes
- HiRadMat : overview and results. What is still missing? Needs for Run III (with LIU beams)
- Status of results from radiation damage tests

Presenter: BERTARELLI, Alessandro (CERN)

Session Classification: Session 3: Specific design aspects and production status

Contribution ID: **19** Type: **not specified**

New materials: status (20+10)

Tuesday 12 February 2019 09:30 (30 minutes)

- Review of the performance of the MoGr without and with coating
- How can we optimize the production of MoGR?
- Other viable solutions: status of tests and validation [coated Gr or CFC]
- What is missing to validate the CuCD?

Presenter: CARRA, Federico (CERN)

Session Classification: Session 3: Specific design aspects and production status

Contribution ID: **20** Type: **not specified**

Review of vacuum performance (20+10)

Tuesday 12 February 2019 10:00 (30 minutes)

- Review of vacuum tolerances for carbon-based materials
- Proposed coating process for the collimator jaws
- Observed 'problems' with the prototypes and proposed mitigation steps
- IR7 vacuum tolerance in light of the vacuum bump test with beam
- Other coating implementations for the HL-LHC other than on the collimator jaws

Presenter: BREGLIOZZI, Giuseppe (CERN)

Session Classification: Session 3: Specific design aspects and production status

Contribution ID: **21** Type: **not specified**

Collimator controls upgrade plans (20+10)

Tuesday 12 February 2019 11:00 (30 minutes)

• Review performance of present system
• Faults driving availability and expectations for HL-LHC
Solutions being studied for controls upgrade, with timeline
• Synergy with consolidation plans

Presenter: MASI, Alessandro (CERN)

Session Classification: Session 3: Specific design aspects and production status

Contribution ID: **22** Type: **not specified**

Crystal collimation for lead ion beams (20+10)

Tuesday 12 February 2019 11:30 (30 minutes)

- Layouts and beam test results
- Operational experience with high intensities in 2018
- Cleaning performance for ion beam collimation
- Is it an operational alternative for improving ion beam cleaning?
- Outcome of the Crystal Collimation day in Oct. 2018 (hardware options for LS2)

Presenter: MIRARCHI, Daniele (University of Manchester (GB))

Session Classification: Session 3: Specific design aspects and production status