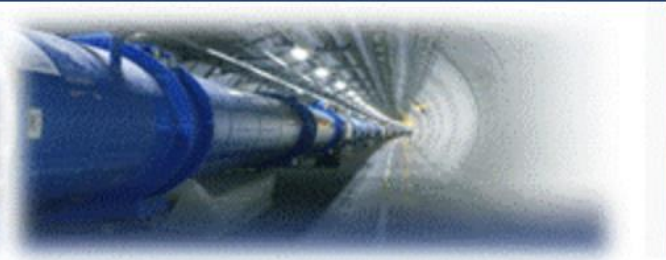


10th LHC Operations "Evian" Workshop



🕒 25 Nov 2021, 09:00

📍 500/1-001 - Main Auditorium (CERN)

Conveners

Session 5: Commissioning & Operation 2022

👤 Theodoros Argyropoulos (CERN)

👤 Georges Trad (CERN)

Thu 25/11

🖨 Print

PDF

Full screen

Detailed view

Filter

09:00

Beam commissioning major phases and planning (20'+ 10')

Matteo Solfaroli Camillocci

500/1-001 - Main Auditorium, CERN

09:00 - 09:30

E-cloud, scrubbing and heat load after LS2 (20' + 10')

Lotta Mether

500/1-001 - Main Auditorium, CERN

09:30 - 10:00

10:00

BLM threshold (15' + 5")

Belen Maria Salvachua Ferrando

500/1-001 - Main Auditorium, CERN

10:00 - 10:20

UFO strategy (15' + 5')

Anton Lechner

500/1-001 - Main Auditorium, CERN

10:20 - 10:40

11:00

A Machine Protection Systems perspective on the commissioning (20' + 10')

Christoph Wiesner

500/1-001 - Main Auditorium, CERN

11:10 - 11:40

An OMC perspective on the commissioning (20' + 10')

Tobias Hakan Bjorn Persson

500/1-001 - Main Auditorium, CERN

11:40 - 12:10

12:00

A Collimation perspective on the commissioning (20' + 10')

Daniele Mirarchi

500/1-001 - Main Auditorium, CERN

12:10 - 12:40

13:00

14:00

MDs in 2022 (20' + 10')

Jan Uythoven

500/1-001 - Main Auditorium, CERN

14:00 - 14:30

Discussion and open points

1) Beam commissioning major phases and planning

- Plan to interleave Checkout tests and magnet training
- Q-Change moved to after Squeeze, no showstoppers expected
- Reduction of crossing angle at start of Stable Beams will not be applied in 2022
- During beta* levelling, TCT settings will be kept constant in mm.
- Beta* levelling will be applied during the intensity ramp-up even for $L < 2E34$
- Strategy of beta* steps during levelling should be agreed on.

2) E-cloud, scrubbing and heat load after LS2

- In LS2, all precautions taken to minimize risk of SEY increasing in the LHC, however many open questions to guarantee no further formation of CuO.
- Hyp: Starting run3 with similar conditions to beginning of Run2
 - 10/12 days requested for scrubbing, interleaved in blocks of 3-4 days
 - The standard 25 ns beam with 1.2×10^{11} p/b (no doublets)
 - intensity ramp-up to 2748 bunches: constant intensity of 1.2×10^{11} p/b
 - periodic fills with bunch intensity of 1.2×10^{11} p/b for heat load benchmarking
 - intensity limitations mitigated by changing the beam configuration (fraction of 8b+4e trains)
- N.B: 2018 tests with 12b trains confirm no e-cloud intensity dependence above $1.5E11$ p/b

Discussion and open points

3) BLM threshold

- In LS2, BLM thresholds model was reviewed (IP7 collimators) with the new damage limits, and better energy scale corrections and is being deployed for Run 3.
- Verification of ratio-to-dump with Run 2 data on-going (longer running sums the new model provides slightly lower thresholds).
- BLM Injection Inhibit firmware will be deployed and fully commissioned in all BLM crates for 2022
- Only 1 signature with MCS-role is now needed to update the master thresholds (2nd person as observer in JIRA)

4) UFO strategy

- Total UFO rate seems (almost) independent of the intensity
- Increased rate in Run 2 not related to new dust contamination in LS1 nor to the heat lead
- Expecting deconditioning wrt to 2018, pursue in Run 3 the 2018's threshold settings strategy, avoiding unnecessary dumps while tolerating quenches (+ reduce thresholds at diodes with reduced He venting)
- IF rates fall back to 2015 values, rocky 2022 expecting 7+ quenches in the first year.
- Discussions needed with experiments to probe the increase of BCM thresholds (avoid LSS UFO dumps).
- UFO buster is a critical tool and needs to be ported to Nxcals storage solution.
- Extension of Run 3 by one year is certainly beneficial from UFO perspective.

Discussion and open points

5) A Machine Protection Systems perspective on the commissioning

- Commissioning procedures to be updated for 2022 and circulated by end January 2022
- Bunch intensity limit in Run 3 is $1.8E11$ protons (to be clarified for TDE core)
- MPP proposal for 2022 intensity ramp-up: starting with 1.15×10^{11} ppb + levelling and pots inserted at every step
- Changes for Run3 (to be tested in 2022):
 - The 'restricted' equation was redefined to 4×10^{10} p+ (flat over all energies)
 - ADT excitation allowed with window of 480 bunches and max. 5 kV at injection
 - TCT interlock limits for beta* levelling handled with pre-sliced limit functions at matched points.
 - BBCW will be used as operational device and interlocked and require a full commissioning.
- Establishment of Major Event Reports to follow up relevant MP issues

6) An OMC perspective on the commissioning

- Study feasibility of mitigating a failing MQSX (radiation) by titling Q3.
- Study a b3 changing knob at Injection at constant coupling to be used also in FIDEL
- Re-measure Q''' in 2022 to investigate observed difference in beam test w.r.t 2018
- Develop collimators setting for configuration of optics meas. (Ac dipole excitation)
- Agreed with MPP to use 3 bunch for commissioning when beta-beat < 20%
- Propose to correct at 60 cm and 30 cm for beta* levelling
- Measuring the ballistic and the 60 deg phase advance optics would be important for understanding the calibration of the BPMs (Around 3% error tentatively attributed to the arc BPMs)

Discussion and open points

7) A Collimation perspective on the commissioning

- Global and Local aperture consistent with 2018 and expectations (excluding 21L3).
- DOROS BPM minor issues on 2 collimators identified to be fixed during YETS.
- SW upgrade:
 - better reliability with no file exchange for settings generation and Centres trimming after alignment
 - New application for Loss Maps and online analysis and new tools for offline analysis.
- In 2022:
 - 4 shifts requested for full alignment and validation
 - Expected ~1h/2h alignment at Injection/Flat Top in 2022 (85/81colls)
 - leveling: Limit function sliced in individually signed segments stored in LSA as function list.
- detailed Async dump simulation needed to validate the approach of adapting TCT settings to effective TCDQ gap change
- Bent crystals will be used as primary collimation stage during 2022 ion run
- Need to address controls failure rate for Run 3 extra year (Complete renewal foreseen for LS3).

8) MDs in 2022

- an updated ASM tool for MD requests and procedures
- Proposal made to change the LHC schedule to have small MD blocks integrated in the second half of the LHC beam commissioning period
- The reduction of OP staff on shift will most likely reduce the efficiency of the MDs