

International Review of HL-LHC Magnet Circuits



Report of Contributions

Contribution ID: 1

Type: **not specified**

Closed Session

Monday 9 September 2019 08:15 (30 minutes)

Contribution ID: 2

Type: **not specified**

HiLumi Status and Charge to Review

Monday 9 September 2019 08:45 (15 minutes)

Presenter: ROSSI, Lucio (CERN)

Contribution ID: 3

Type: **not specified**

Quick Overview on the HL-LHC Magnets Characteristics

Monday 9 September 2019 09:00 (30 minutes)

This talk is intended to be a general introduction to the magnet designs and relevant aspects of the requirements, in particular the ones related to powering and optics.

Presenter: Dr TODESCO, Ezio (CERN)

Contribution ID: 4

Type: **not specified**

Introduction to the HL-LHC Circuits and Report from Previous Review

Monday 9 September 2019 09:30 (30 minutes)

This talk presents a global view on the baseline of the HL-LHC circuits and a synopsis of the choices that were made to reach it. An important milestone for the definition of the circuits was the CERN Internal Review of the HL-LHC Magnet Circuits in March 2017. This review outcome and the implementation of the follow-up of the recommendations will be also presented.

Presenter: RODRIGUEZ MATEOS, Felix (CERN)

Contribution ID: 5

Type: **not specified**

Warm Powering and Adequacy with Respect to Requirements

Monday 9 September 2019 10:00 (30 minutes)

In order to achieve the requirements of the HL-LHC optics and in adequacy with the LHC machine, the power converters have strict requirements on performance. This talk presents the requirements of the circuits (current, ramp rates, acceleration rates, precision, accuracy, etc.) and translates them into power converter requirements (current, voltage, control and measurement class). Moreover, the required warm cable resistances and configuration are briefly discussed to respect the cycle operation requirements.

Presenter: MARTINO, Michele (CERN)

Contribution ID: 6

Type: **not specified**

Cold Powering

Monday 9 September 2019 10:45 (30 minutes)

The cold powering configurations are presented in this talk. From current leads to the connection to the bus bars in the cold masses, through the superconducting link, this talk includes a description of the baseline including the requirements and the applied solutions. The present design status in terms of feedboxes is also included in the talk.

Presenter: Dr BALLARINO, Amalia (CERN)

Contribution ID: 7

Type: **not specified**

Superconducting Bus Bars Inside Cryostats

Monday 9 September 2019 11:15 (25 minutes)

This talk contains a description of the variety of bus bars proposed for the connections from cold powering equipment to the actual magnet terminals. The rationale behind the different choices as well as the present baseline for splices and their location will be discussed.

Presenter: TODESCO, Ezio (CERN)

Contribution ID: 8

Type: **not specified**

Quench Protection Strategies

Monday 9 September 2019 11:40 (50 minutes)

The definition of the quench protection strategies for each circuit type are discussed, based on analysis and simulations. Requirements and solutions for quench protection—including coils, bus bars, link, current leads- will be presented, from simulations to protection layouts, with a detailed view of the requirements and the results. Failure scenarios are also included in this talk.

Presenter: VERWEIJ, Arjan (CERN)

Contribution ID: 9

Type: **not specified**

Quench Detection, related Hardware and Required Instrumentation

Monday 9 September 2019 13:30 (30 minutes)

How the quench detection is going to be performed on the different s.c. parts of the circuits? What hardware is going to be used? A discussion of the requirements and performance of the hardware will be presented. This talk includes a discussion on the required instrumentation expected for a dependable quench detection.

Presenter: DENZ, Reiner (CERN)

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

Quench Protection Hardware

Monday 9 September 2019 14:00 (30 minutes)

The different subsystems composing the quench protection system (other than the quench detectors) are presented in this talk. Namely, cold diodes, quench heater power supplies, energy extraction systems and CLIQ units are reviewed. The relevant aspects required for a dependable quench protection are discussed in this talk.

Presenter: Dr CARRILLO, David (CERN)

Contribution ID: 11

Type: **not specified**

Design for the Protection and Diagnostic Feeders of the HL-LHC Triplets

Monday 9 September 2019 14:30 (25 minutes)

The design of the feeders serving the IFS CLIQ and k-mod systems to fulfil their thermo-electric, mechanical and cryogenic requirements will be presented. The routing of the related feedthroughs and ancillary equipment for connection at their warm and cold ends will be illustrated.

Presenter: WILLIAMS, Lloyd Ralph (CERN)

Contribution ID: 12

Type: **not specified**

Contribution of Power Converters to the Protection of the Circuits

Monday 9 September 2019 14:55 (30 minutes)

The contribution of the power converters to the protection of the circuits will be presented in the talk. Mainly, the crowbar systems will be described in addition to their operation. The resistance values of the crowbars and the different discharge curves in the case of power aborts will be shown in particular for the inner triplet circuit.

Presenter: YAMMINE, Samer (CERN)

Contribution ID: 13

Type: **not specified**

Effects of Protection Equipment on the Beam and Reliability Studies for the Circuit Protection Systems

Monday 9 September 2019 15:25 (30 minutes)

Spurious firing of the protection equipment can introduce an additional magnetic field to the magnets and can affect the beam trajectory. This talk will describe the effects of the protection equipment on the beam and the foreseen mitigations for the machine protection.

Presenter: WOLLMANN, Daniel (CERN)

Contribution ID: **14**

Type: **not specified**

Integration Studies

Monday 9 September 2019 16:10 (30 minutes)

An overview of the integration studies in the different underground areas and the corresponding baseline will be presented.

Presenter: MODENA, Michele (CERN)

Contribution ID: 15

Type: **not specified**

Voltage Withstand Levels

Monday 9 September 2019 16:40 (30 minutes)

A review of the baseline for the voltage test levels which are to be used within the qualification of insulations in the different magnet systems, as well as the evolution of the applied criteria will be discussed.

Presenter: RODRIGUEZ MATEOS, Felix (CERN)

Contribution ID: **16**

Type: **not specified**

Closed session

Monday 9 September 2019 17:10 (1h 20m)

Contribution ID: 17

Type: **not specified**

Voltage Withstand Levels

A review of the baseline for the voltage test levels which are to be used within the qualification of insulations in the different magnet systems, as well as the evolution of the applied criteria will be discussed.

Presenter: RODRIGUEZ MATEOS, Felix (CERN)

Contribution ID: **18**

Type: **not specified**

11T MBH: Electrical Integrity and Quench Protection Test Results

Tuesday 10 September 2019 08:30 (30 minutes)

This talk presents the relevant results coming from tests performed on model, prototype and series magnets. The talk focuses on electrical integrity and quench protection tests, which are appropriate to the qualification of the insulation system and the quench protection strategy. In particular, the evolution of the quench heater insulation will be discussed.

Presenter: SAVARY, Frederic (CERN)

Contribution ID: 19

Type: **not specified**

MQXF: Electrical Integrity and Quench Protection Test Results

Tuesday 10 September 2019 09:00 (30 minutes)

This talk presents the relevant results coming from tests performed on model and prototype magnets. The talk focuses on electrical integrity and quench protection tests, which are appropriate to the qualification of the insulation system and the quench protection strategy. In particular, the evolution of the quench heater insulation will be discussed.

Presenters: AMBROSIO, Giorgio (Fermilab); FERRACIN, Paolo (CERN)

Contribution ID: 20

Type: **not specified**

NbTi magnets: Electrical Integrity and Quench Protection Test Results

Tuesday 10 September 2019 09:30 (20 minutes)

This talk presents the relevant results coming from tests performed on model and prototype magnets. The talk focuses on electrical integrity and quench protection tests, which are appropriate to the qualification of the insulation system and the quench protection strategy.

Presenter: FOUSSAT, Arnaud Pascal (CERN)

Contribution ID: 21

Type: **not specified**

The HL-LHC Inner Triplet String

Tuesday 10 September 2019 10:25 (30 minutes)

The complete systems' validation in a full scale Inner Triplet String will be presented, including the proposed test programme, the schedule and the expected outcome.

Presenter: BAJKO, Marta (CERN)

Contribution ID: 22

Type: **not specified**

Closed session including working lunch for Panel

Tuesday 10 September 2019 11:15 (2h 15m)

Contribution ID: 23

Type: **not specified**

Close out of the Review

Tuesday 10 September 2019 17:15 (1 hour)

Contribution ID: 24

Type: **not specified**

Document Plan, Management of Change

Tuesday 10 September 2019 10:05 (20 minutes)

The Magnet Circuit Forum has created, collected and managed the documentation for the HL-LHC magnet circuits and related studies. This talk will present the documentation plan for the HL-LHC magnet circuit and the strategy of the management of the change in accordance to the HL-LHC Project Documentation Plan.

Presenter: YAMMINE, Samer (CERN)

Contribution ID: 25

Type: **not specified**

Safety Aspects

Tuesday 10 September 2019 10:55 (20 minutes)

The HL-LHC underground galleries are accessible to personnel during operation of the accelerator. This implies the strict application of international or national standards for electrical safety to the installed equipment. I will present the Safety Process for HL-LHC equipment. It starts with a hazard assessment, and progresses with risk assessment, definition of mitigation, and safety checks. Finally, safety clearance is given by the project or by the Health, Safety and Environmental Protection Unit.

Presenter: OTTO, Thomas (CERN)

Contribution ID: 26

Type: **not specified**

Risk analysis of the string systems

Tuesday 10 September 2019 13:30 (15 minutes)

Presenter: BAJKO, Marta (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: 27

Type: **not specified**

Table with voltages and temperatures on QXF magnets

Tuesday 10 September 2019 13:45 (15 minutes)

Presenter: Dr RAVAIOLI, Emmanuele (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: 28

Type: **not specified**

Voltage withstand levels and quench heater position for QXF and 11T MBH

Tuesday 10 September 2019 14:00 (1 hour)

Presenters: SAVARY, Frederic (CERN); AMBROSIO, Giorgio (Fermilab); FERRACIN, Paolo (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: 29

Type: **not specified**

Splices in HL-LHC cryostats

Tuesday 10 September 2019 15:00 (15 minutes)

Presenter: PRIN, Herve (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: **30**

Type: **not specified**

Reliability of the complete inner triplet circuit protection

Tuesday 10 September 2019 15:15 (15 minutes)

Presenter: APOLLONIO, Andrea (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: 31

Type: **not specified**

Feedback from LHC and MDs done with respect to effects to beam by misfiring of protection elements

Tuesday 10 September 2019 15:30 (15 minutes)

Presenter: WOLLMANN, Daniel (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: 32

Type: **not specified**

How to guarantee security of firmware in quench detection and potential protection implications

Tuesday 10 September 2019 15:45 (15 minutes)

Presenter: DENZ, Reiner (CERN)

Session Classification: Session on Specific Questions by the Panel

Contribution ID: **33**

Type: **not specified**

Closed session

Tuesday 10 September 2019 16:00 (1h 15m)