



# Transient effects in the superconducting circuits of the (HL)-LHC

Code	TE7624
Programme	FCT
Department	TE
Responsible	37315 - Dr. Andrzej Siemko

## Title

Transient effects in the superconducting circuits of the (HL)-LHC

## Description

The Large Hadron Collider is a complex machine that comprises thousands of superconducting magnets which shape and direct the particle beams. During operation, these magnets store gigajoules of magnetic energy. In case of loss of superconductivity the circuits powering the magnets have to be quickly and safely discharged to prevent permanent damage to the magnets and busbars.

In this project you will perform combined electro-magnetic and thermal calculations to evaluate the protection systems that protect the superconducting magnets and busbars in the Large Hadron Collider, as well as ensure protection of the next-generation superconducting magnets which are to be installed as part of the High Luminosity upgrade. These studies touch on a broad range of topics such as modeling of heat transfer in a superfluid helium environment, analysis of the efficiency of novel magnet quench protection techniques such as CLIQ, modeling of the behaviour of entire superconducting magnet circuits including their powering devices, and so forth. Furthermore, these studies are an important contribution to the long-term reliability and availability of the Large Hadron Collider.

## Skills

Applied Physics: Cryogenics . Low and High Frequency Engineering: Energy distribution networks, Filters. Theory of Electrical Engineering: Application of numerical codes for design, Modeling and simulation, Numerical methods, FEM, BEM

Ability to work in a team. Applied physics or electrical engineering background. Familiarity with numerical analysis. Knowledge of superconductivity and Java programming language are advantages.

## Disciplines

Applied Physics, Electronic Engineering

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