Contribution ID: **25** Type: **Invited Oral**

# Multi-physics modeling of metal-insulated REBCO magnets with screening currents

*Tuesday, 11 June 2024 13:30 (30 minutes)*

The design of REBCO high temperature superconducting (HTS) ultra-high-field magnets requires fast and accurate multi-physics modelling (electromagnetic, thermal and mechanical). This contribution presents a novel computationally-efficient multi-physics method that takes screening currents into account. We apply this method to a REBCO insert within a 19 T / 150 mm bore low-temperature superconducting (LTS) magnet. We analyze the electro-thermal quench behavior, the thermal stress during quench, and the axial force on the LTS due to quench in the HTS insert. Results suggest that AC loss from screening currents speed-up electrothermal quench.

## Topic

Coupled and uncoupled multiphysics problems

**Primary author:** PARDO, Enric (Institute of Electrical Engineering, SAS)

**Co-authors:** DADHICH, Anang (Institute of Electrical Engineering, SAS); Dr SRIVASTAVA, Arpit Kumar (Institute of Electrical Engineering, SAS); FAZILLEAU, Philippe (CEA Paris Saclay); JERANCE, Nikola (CEA Paris Saclay); Dr VARNEY, Andrew (Oxford Instruments Nanoscience); Dr BALL, Steven (Oxford Instruments Nanoscience)

**Presenter:** PARDO, Enric (Institute of Electrical Engineering, SAS)

**Session Classification:** Session 1: Coupled & Uncoupled Multiphysics Problems