STEAM Software Framework to Simulate Transients in Accelerator Magnets and Circuits

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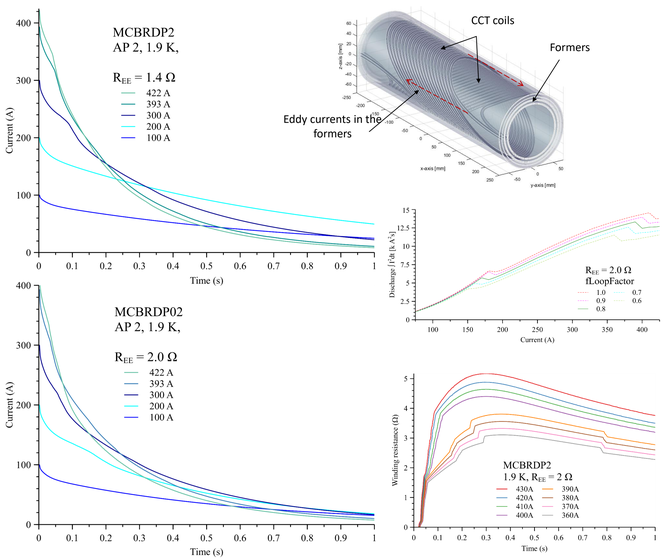
STEAM (Simulation of Transient Effects in Accelerator Magnets) contains a suite of in-house developed programs used to model transients in superconducting magnets.

- **BBQ**: simulate 1D quench propagation in superconducting busbars
- **COSIM**: run cooperative simulations of models developed in different programs (and possibly by different people)
- **LEDET** [developed with LBNL, Berkeley, CA]: simulate electro-magnetic and thermal transients in accelerator magnets in 2D and 3D geometry
- **SIGMA**: automatically generate FE models of superconducting magnets
- **PROTECCT**: simulate quench transients in CCT-type magnets
- **SING**: automatically generate models of electrical circuits

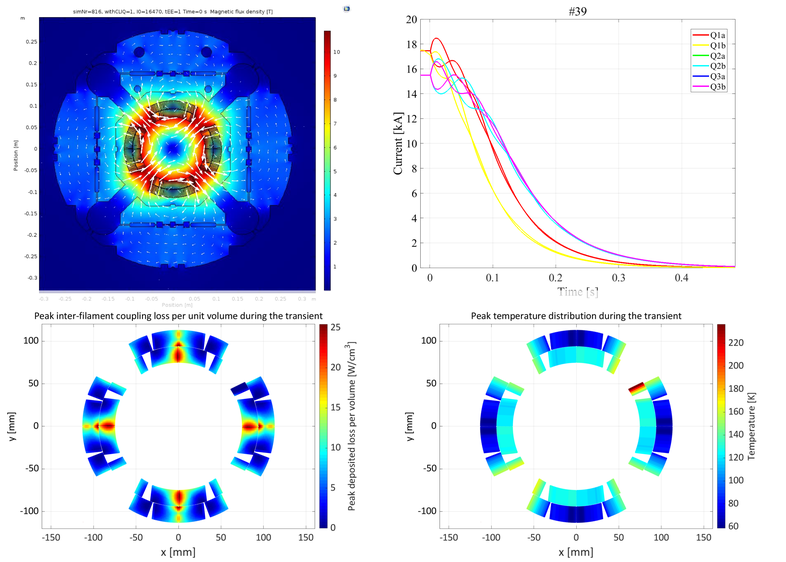
The list of programs and applications is constantly evolving

Supported software: COMSOL, LTSPICE, PSIM, PSPICE, QLASA

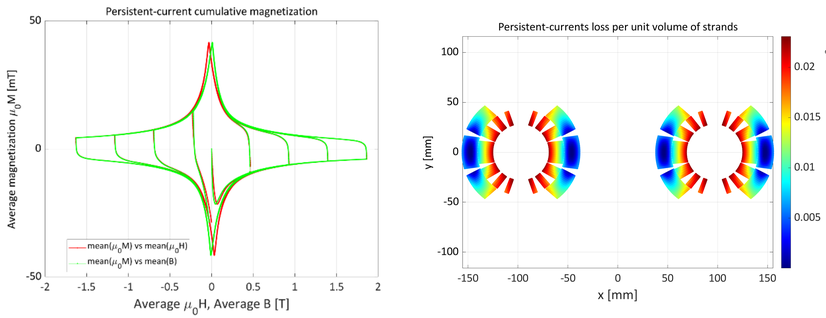
Quench transient in a CCT magnet



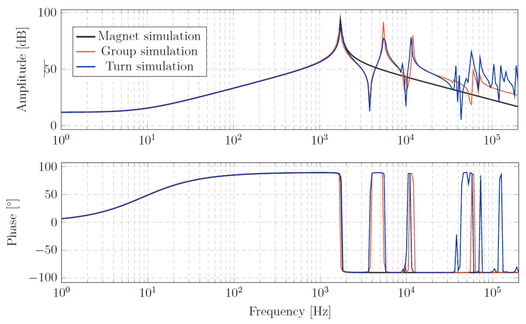
Co-simulation of HL-LHC inner triplet circuit



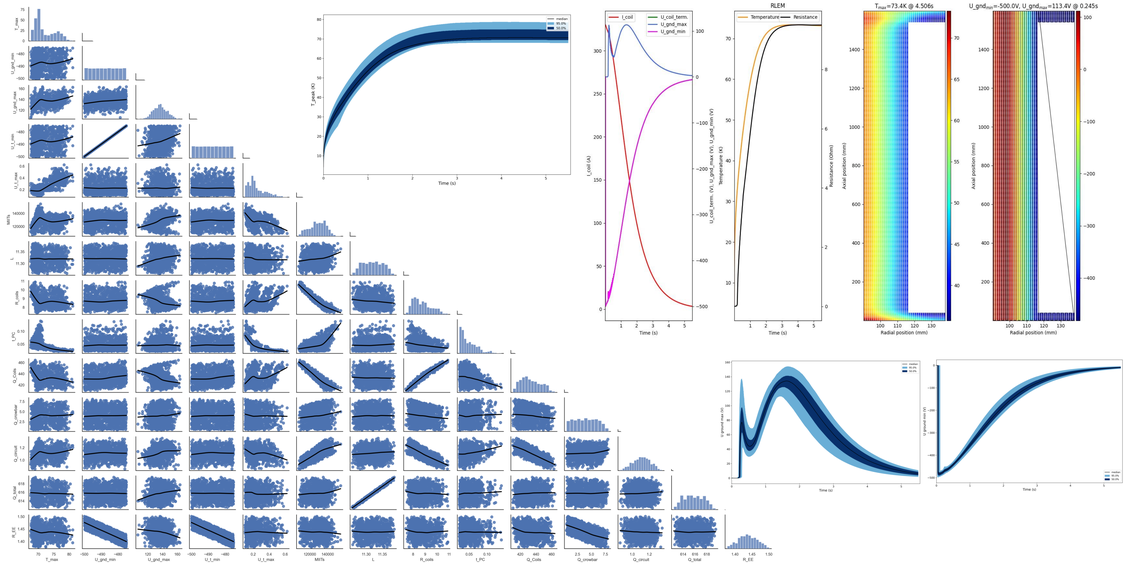
Effect of persistent currents on the magnet behavior



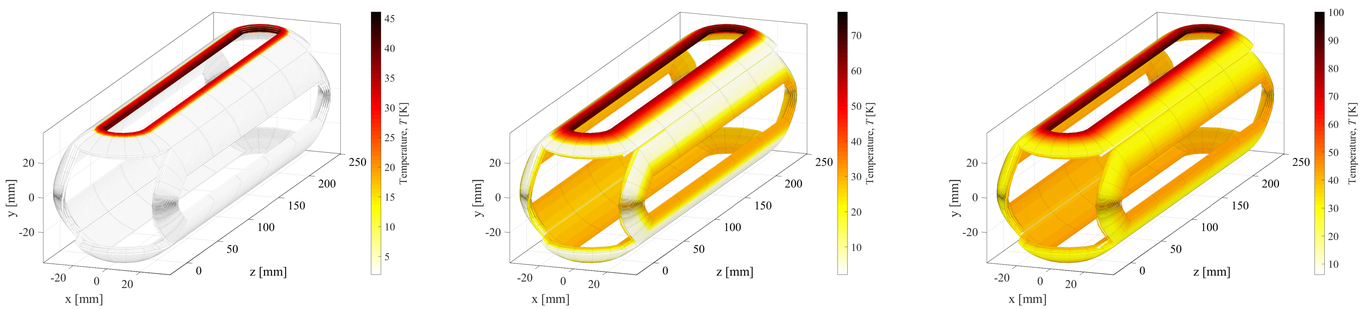
f-domain magnet modeling



Uncertainty quantification in quench simulations



3D electro-thermal quench simulation in a full-scale magnet



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