Current activities on Magnet Engineering & Applied Superconductivity at the University of Bologna

Marco Breschi
Lorenzo Cavallucci
Massimo Fabbri
Antonio Morandi
Andrea Musso
Pier Luigi Ribani

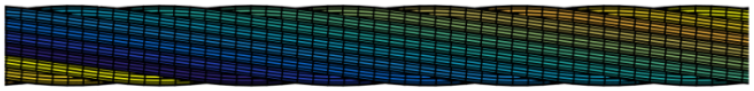
DEI – Guglielmo Marconi
Dep. of Electrical, Electronic and Information Engineering
Alma Mater Studiorum – Università di Bologna, Italy

December 14th, 2021
Meeting of the Future Superconducting Magnet Technology Council

Modeling at LIMSA

Accelerator magnets

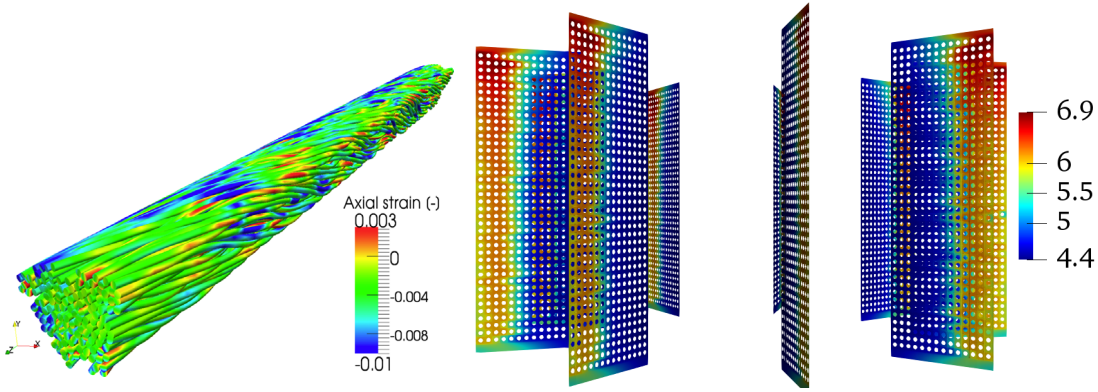
Rutherford cable



CERN - CNAO

Stability of accelerator magnets

Fusion magnets

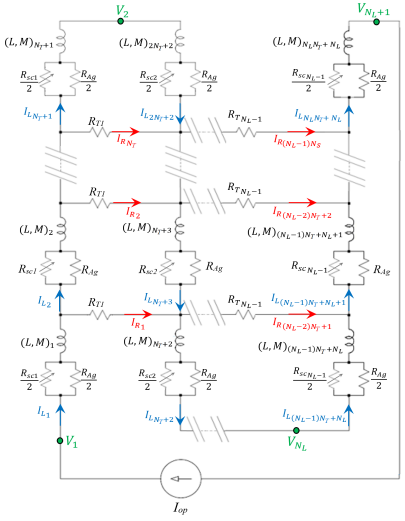


Cable

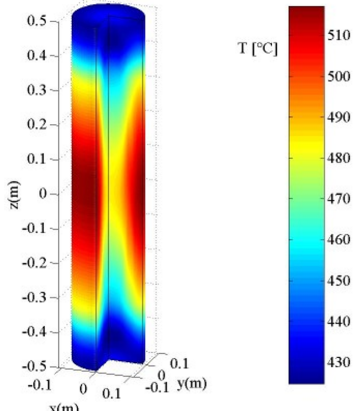
Magnet (CS Module)

NI coils

Circuit model of NI coil



Temperature

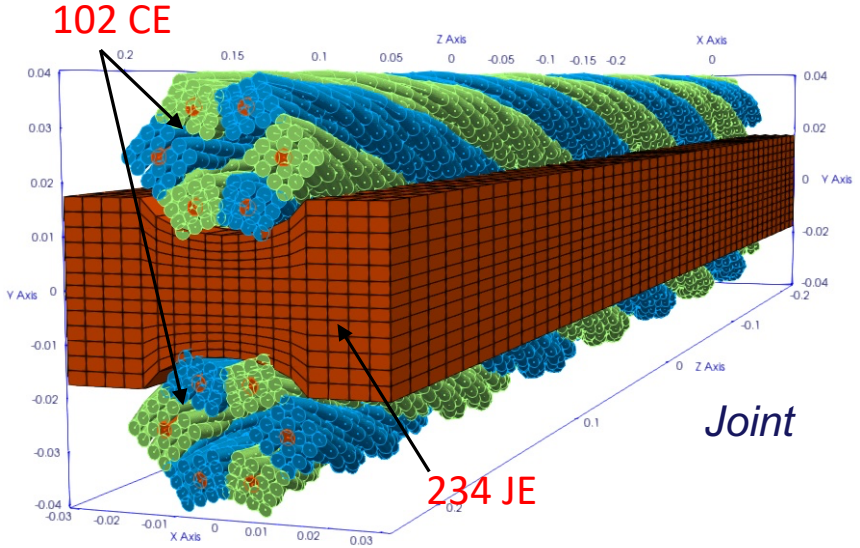


HTS bulks

3D models of bulk HTS magnets and conductors

ITER – ENEA

AC losses and current distribution in strands, CICCs and full size magnets

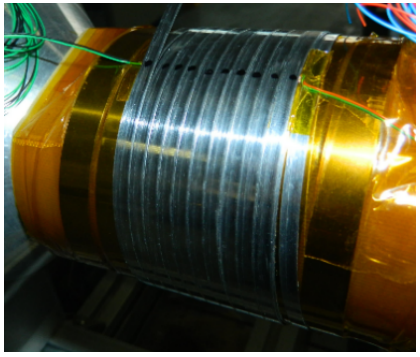


Joint

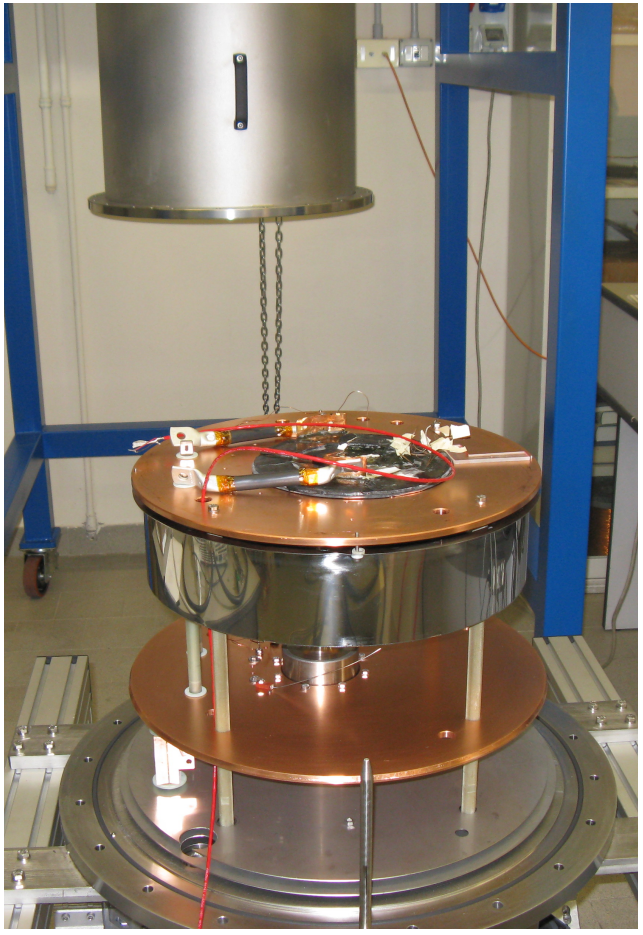
Experiments at LIMSA

Biaxial handling (PM) and levitation force measurement system, 500 N max

Characterization of MgB2 and YBCO bulks or composite



NI coils



Test facility

AC loss and quench analysis of HTS tapes

Quench analysis on MgB2 pancakes

Test of small Coils down to 10 K

Test of small NI coils

Projects at LIMSA

Project DRYSMES4GRID funded by MISE

- Budget: 2.7 M€ - Project successfully concluded on October 15, 2021
- development of a dry-cooled SMES based on MgB2

Project Coordinator:

- Columbus Superconductors SpA

Partners

- University of Bologna
- ICAS - Frascati (Rome)
- RSE S.p.A - Milan
- CNR – SPIN, Genoa

Project Open Source MRI scanner funded by MIUR (Ministry of University and Research)

- Development of an open-source magnetic resonance imaging (MRI) scanner:
- anatomical regions with a limited field of view (15 mm radius, 30 mm height)
- low cost, compact (0.4 T, 16 ppm in FOV)