Quench detection, protection and diagnostic methods for Nb$_3$Sn and HTS HFM

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CERN, TE-MPE
Key drivers, technologies and values

Opportunities & Trends
(Directions in which the field is going to progress)

Conductor:
- Advanced and Diversified Nb$_3$Sn
- HTS for Accelerator Magnets

Magnet:
- High Field and Energy Density LTS
- HTS and Hybrid Magnets

Novel or Advanced:
- Design and Simulation methods
- Insulation and Powering
- Production methods
- Materials

Technologies and Solutions
(What we are going to research and develop)

Detection
Integrated Design, Advanced Methods

Protection

Protection Limits
Reliable Design, Improved Learning

Diagnostic
Tools
Specialized and Trusted Transient (Quench) Simulations

Models

Values and Principles
(The is what is going to be driving choices of solutions)

Reliability and Industrialization
Total cost of ownership
Maintenance and Repeatability
HFM WP4.5 Activities Overview

HFM Organization
- Def. framework work plans
- Estimation of resources
- Detailed plans and meetings

HFM Directly
- E-CLIQ (Staff, Tim)
- Impedance based Quench Detection (PhD student, Magnus in EP)
- Conductors in Quench Simulations (Fellow)

HFM Spin-In
- HTS NI Coil Simulation Methods (Erik)
- FE Quench Simulator Development (FiQuS) (Andrea, Erik, Tim, Mariusz)

STEAM framework (STEAM team)

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4
2022 2023 2024 2025 2026
Let’s write down and evaluate your ideas and plan R&D work on them!