Possible KIT contributions to FP9-WPMAG and in particular hybrid HTS-LTS CS coils
Zoom, May 11, 2021 10:00 am, KIT, SPC, ENEA

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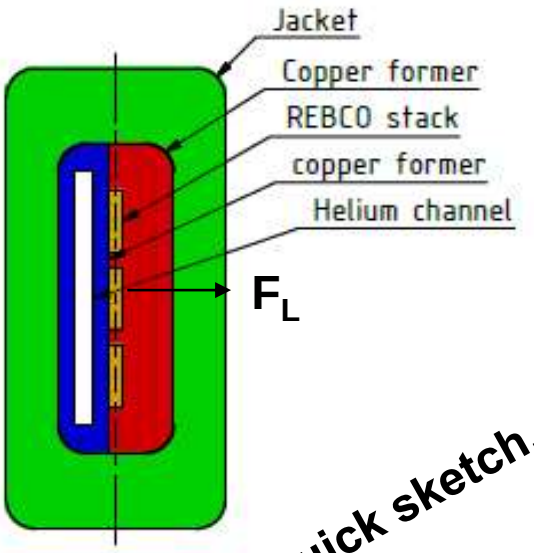
The views and opinions expressed herein do not necessarily reflect those of the European Commission.

Starting point: STARS-like conductor



NB:
This is just a quick sketch,
Not a real design

„Simplest possible conductor“:

- Tapes parallel to the field direction
- Tapes oriented at the radial conductor center
- Several non-twisted stacks
- Stack thickness < 3mm → bending strain < 0.1 %
- Lorentz forces perpendicular to tapes
- Low-resistive contact to stabilizer (quench)
- Simple fabrication (pre-fabricate soldered stacks, solder to profiles, assemble, weld jacket)
- Scalable also to higher currents

Challenges and potential show-shoppers:

- AC losses (in particular at the ends of CS3U/L) ?
- Quench and Quench detection?
- Mechanical rigidity of flat jackets?

Proposal for the Task Specification 2021

T-01-04 Preparation sub-scale HTS CICC for quench investigations

- *FBI test on a HTS CroCo based triplet sample*
- *Preparation of the HTS quench sample for testing in the SULTAN facility*

T-01-01 R&D on a new HTS CICC proposal by KIT

- *Design of HTS CICC for CS(dimensions, parts)*
- *Specification of key cable components (e.g. HTS tape, profiles)*
- *Preparation of a sub-scale version of the HTS CICC for CS (towards a test in the FBI facility)*

S-01-01 HTS CICC proposal for the hybrid HTS-LTS-CS by KIT

- *Analysis of KIT HTS CICC for hybrid HTS CS*

S-01-03 Thermal-hydraulic analysis of the HTS CICC proposal by KIT

- *Thermal-hydraulic analysis of the HTS CICC proposal for the hybrid HTS-LTS-CS by KIT*

Tentative - Further Work -2025

2022 Pre-tests and preparation of a SULTAN sample (KIT HTS CICC design)
Detailed analysis work on HTS CS analysis (mech., hydr., AC loss)

2023 Analysis of test results, refined design?
start of work on components (terminations / joints, …)

2024/25 Activities depending on the results of the results 2021-23