

News from KIT ITEP

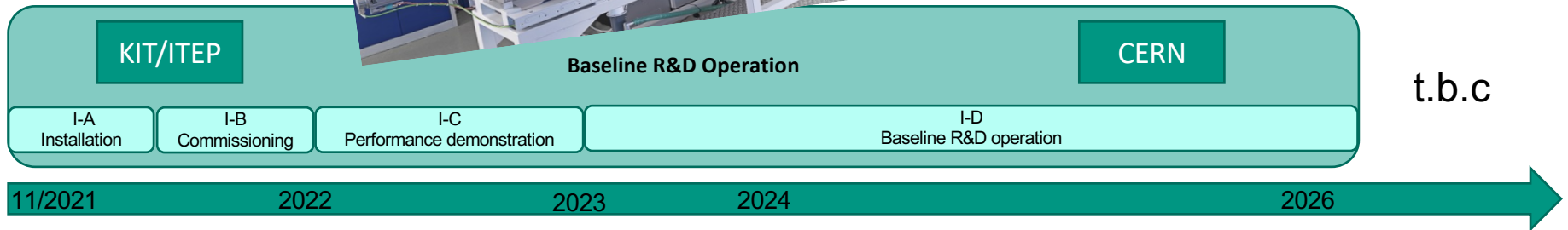
Klaus-Peter Weiss

Courtesy of Tabea Arndt & Bernhard Holzapfel, KIT ITEP, 07.12.2021



New KIT-CERN Collaboration on Coated Conductor KC⁴

- KIT and CERN will establish a **joint, open HTS CC synthesis Lab**, bridging the gap between small scale basic materials research on CC and larger scale component requirement in sufficiently long length of **tailored, high quality full Coated Conductor architectures**
- KC⁴ is based on established Bruker CC-technology for long CC and wide tapes



Superconducting Power System Components



- Energie- und Netzkomponenten
- BMWi Projekt RoWaMag

Goal:

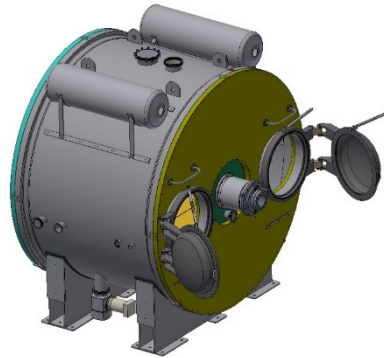
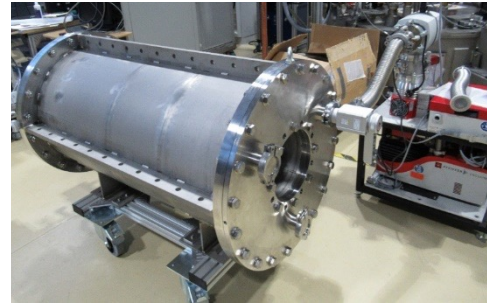
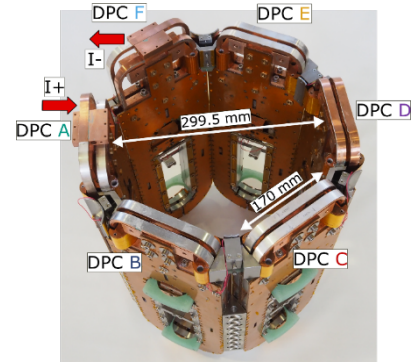
Magnetic Billet Heater

Status:

- Assembly of kryo-parts started
- HTS coil in casing placed
- HTS magnet received 11/2021

Robust and low-maintenance MBH for industry.
Real-time integration and simulation...

Superconducting Magnet Technology – Rotating Machines



weight: ~ 16,2 to
 \varnothing : ~ 3150 mm
height: ~ 3500 mm
width: ~ 2250 mm

■ DC Wind Generator

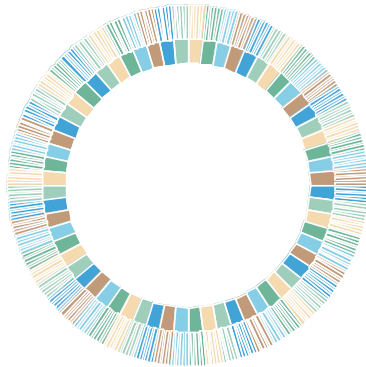
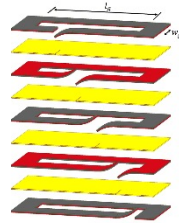
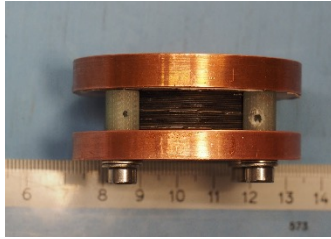
- 12 NI-HTS-Pancake-Coils (6 poles)
- Successful test of coils (30 K, 350 A steady current, max. current 700 A {Design 450 A})

■ HTS-Geno Testrig

- Review drawings*
- Review vacuum vessel*
- Design trailer and supports*
- Review of rotor forging for more flexible use*
- Extending infrastructure*
- Purchase of cryo coolers and rail system (22 m)

Work on large machines (WP & component testing).
Work on smaller machines...

Superconducting Magnet Technology – Rotating Machines



Symbolic Sketch (not to scale)

Parameter	Value	Unit
Power	7.3	MW
Rotation	3000	rpm
Length	0.300	m
Radius of Airgap	0.200	m
Number of pole pairs	32	n.a.
Field Current (at ≈ 20 K)	400	A
Number of slots	384	n.a.
Armature current (at ≈ 20 K)	80	A

■ DUDA concept

■ Paper in SUST

<https://doi.org/10.1088/1361-6668/ac19f4>

- will be followed in projects HTSCompAcc (accelerators) and by joint research SFB-proposal Hyperion
- Analytical emag Machine-Model for high-pole-number-air-teeth topology created.
- Basic designs of first machines

DUDA concept might be of special benefit for compact rotating machines.

Thank you...