UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES

International MUON Collider Collaboration

HTS conductor studies at University of Geneva

Focus on REBCO coated conductors

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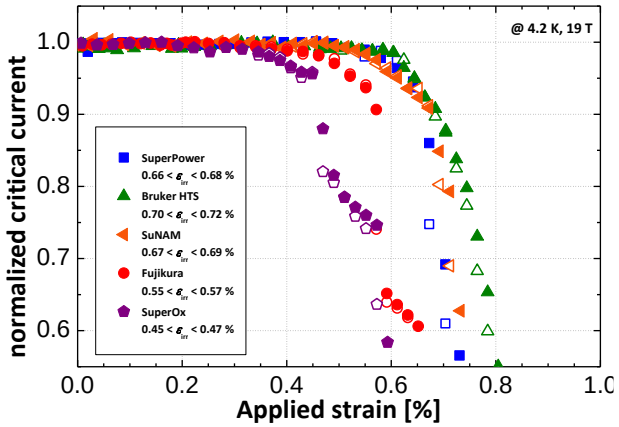
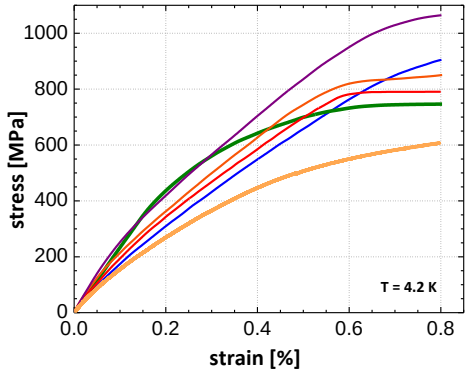
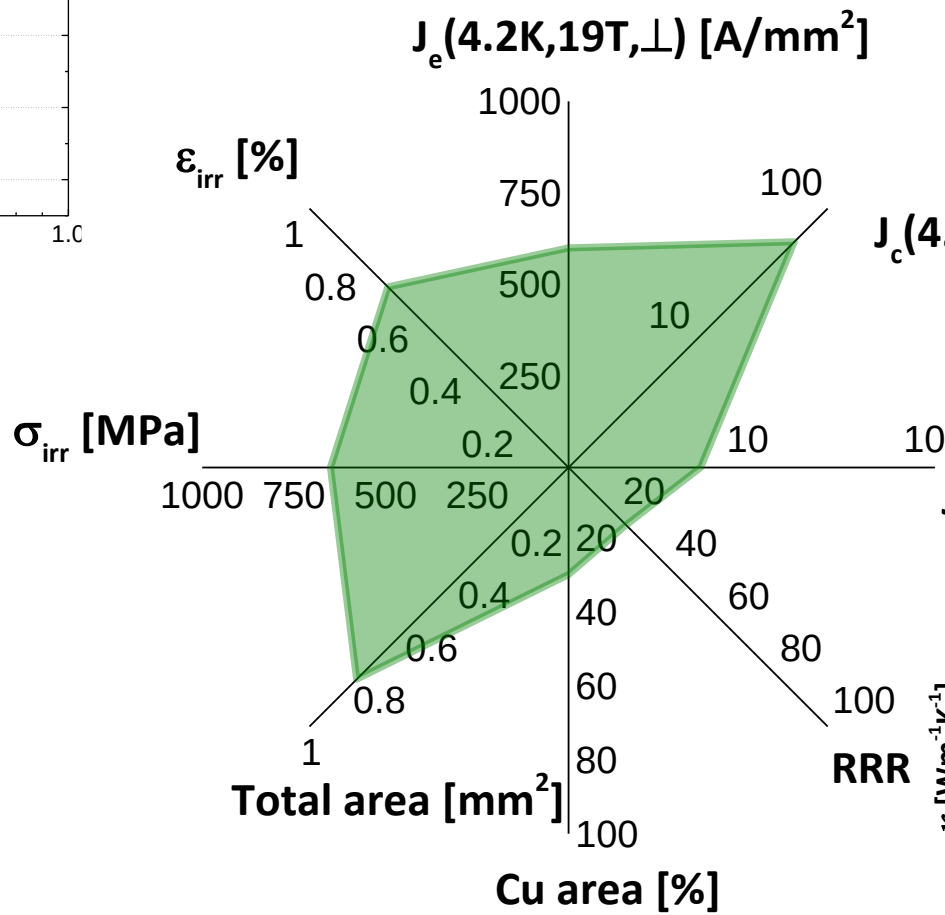
Overview of the HTS testing facilities

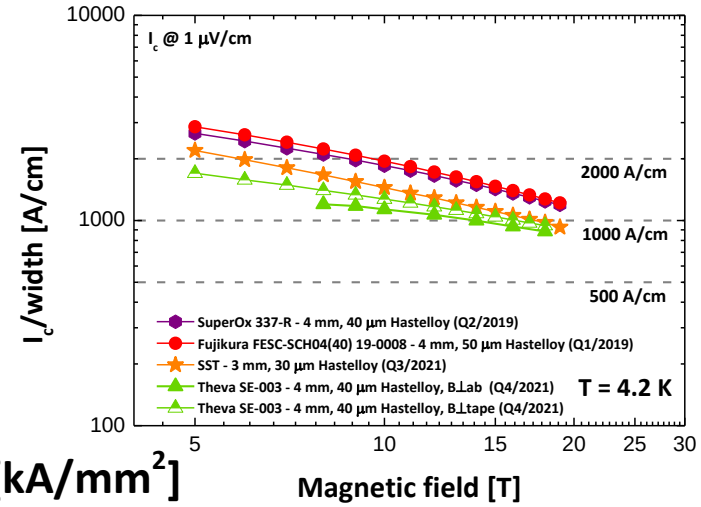
High-Field Low-Temperature characterization





Electromechanical properties

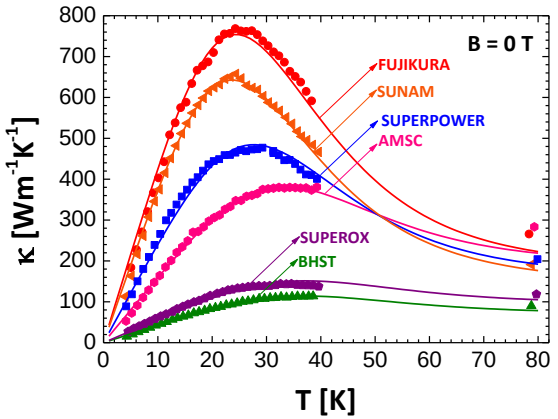


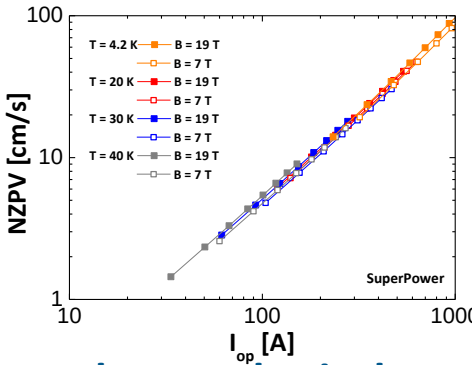


J_c(4.2K,19T,⊥) [kA/mm²]

Critical surface

J_c(77K,s.f.) [kA/mm²]





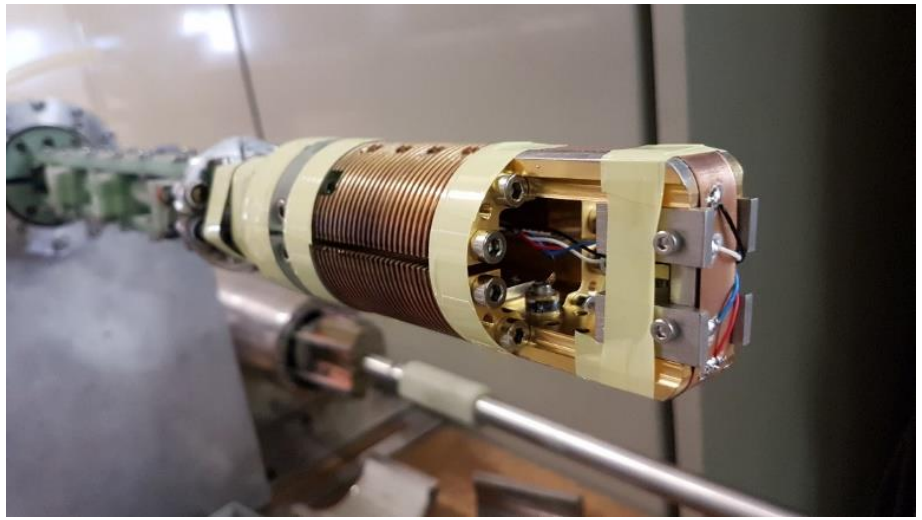
Thermophysical properties

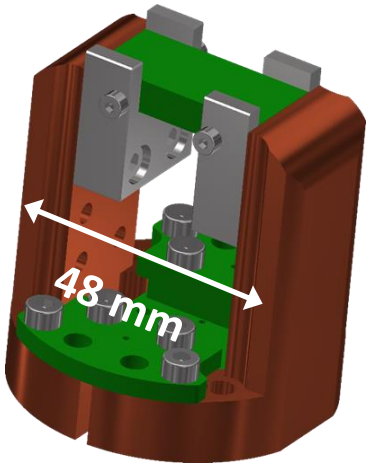
Tapes inventory for MuCol

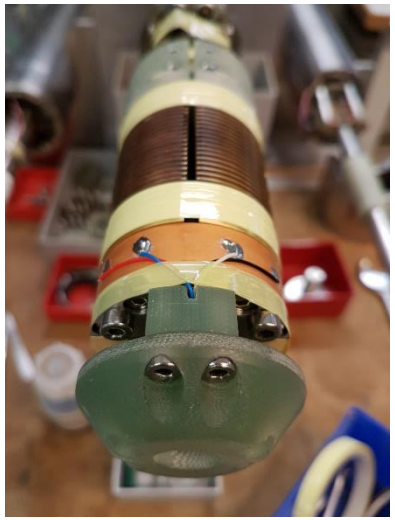
	Length	Width	Thickness	Substrate thickness	Cu thickness	I_c (77K, s.f.)
上海超导™ SHANGHAI SUPERCONDUCTOR	25 m	4 mm	75 μm	50 μm	20 μm	160 A
FARADAY FACTORY JAPAN	5x 10 m	4 mm				172-180 A
SuperPower Inc. SCS4050-HM	10 m	4 mm		50 μm	10 μm	
Fujikura FESC-SCH02	10.7 m	2 mm	75 μm	50 μm	20 μm	105 A

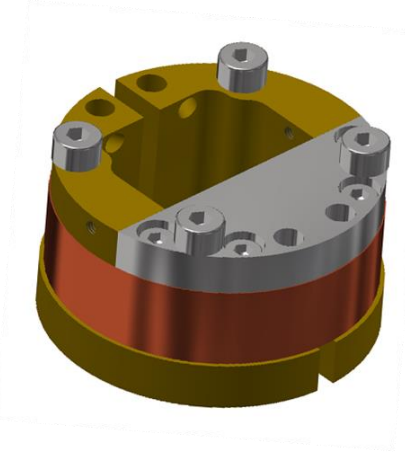
Transport critical current tests up to 2 kA

Magnetic fields up to 19 T/21 T and temperatures up to 50 K in a 50 mm VTI

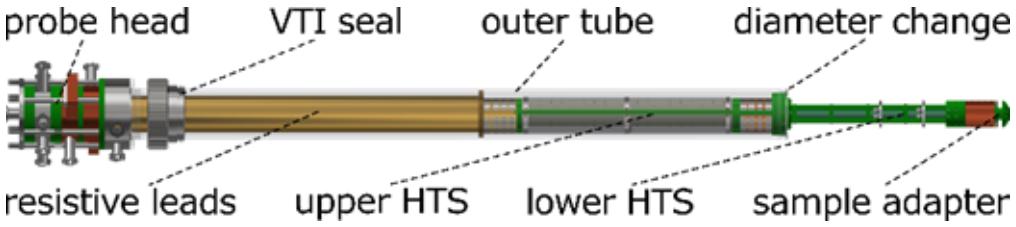


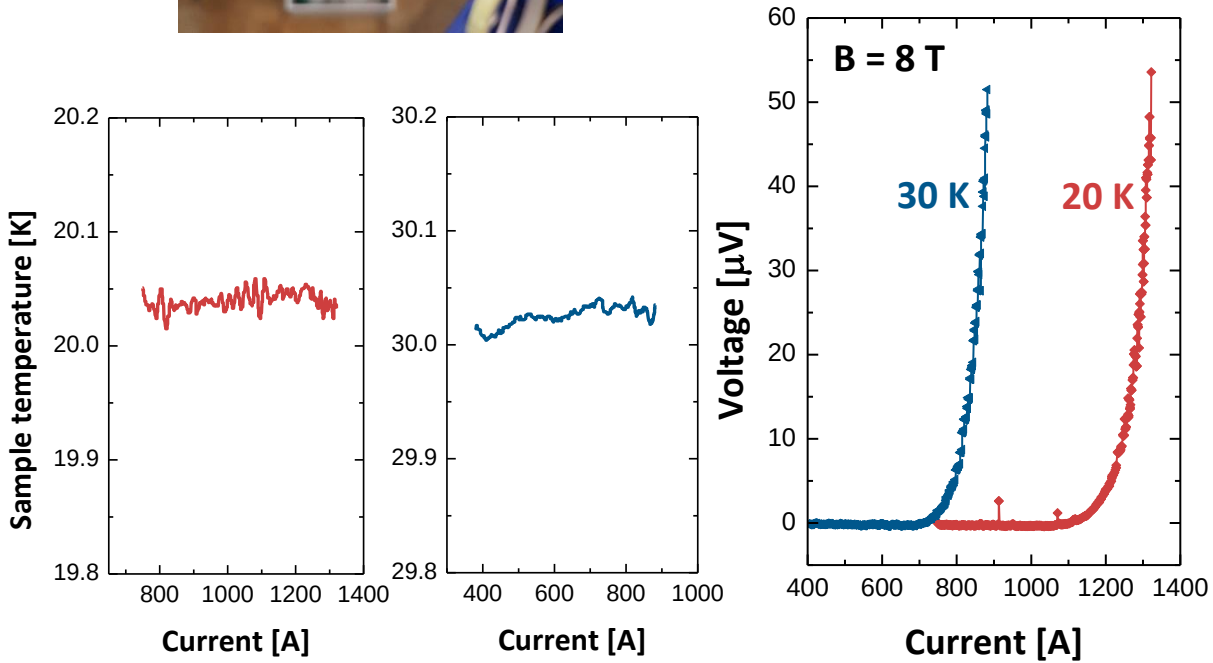






- Possible to test long samples (> 120 mm) at various angles: θ = 0°, 5°, 7.5°, 10°, 15° and 90°
- Active stabilization of the sample temperature



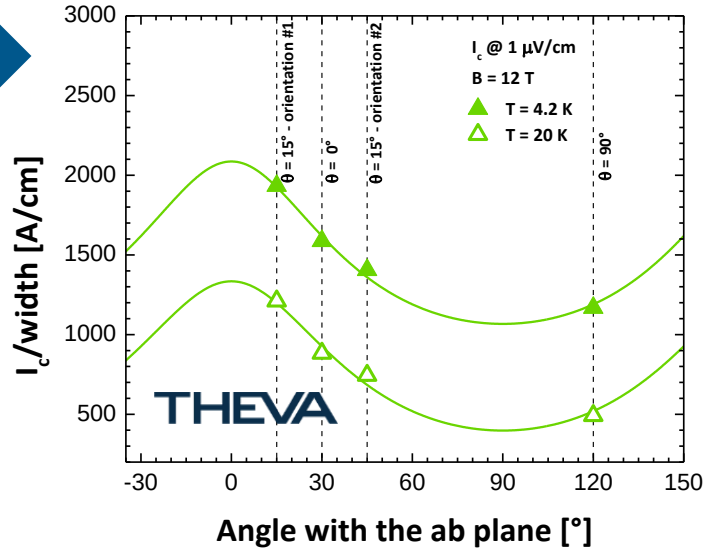


Barth, Bonura, and CS, IEEE Trans. Appl. Supercond., 28 (2018) 9500206
DOI: 10.1109/TASC.2018.2794199

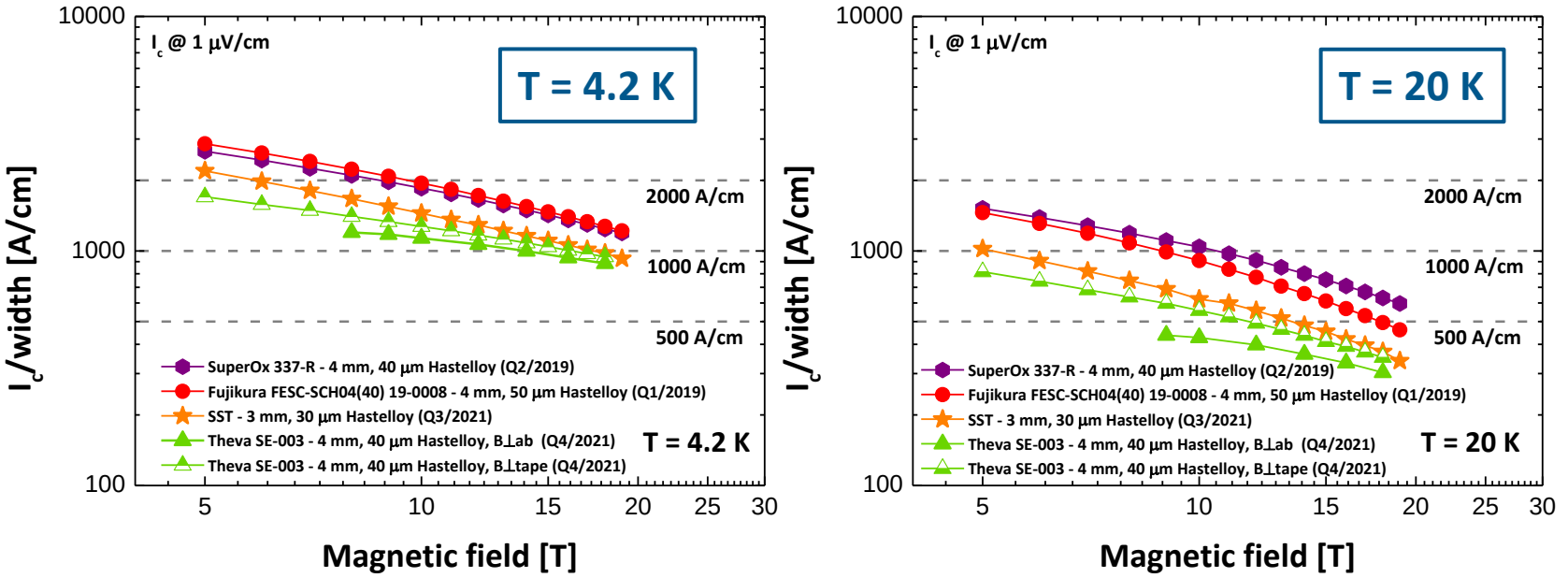
Transport critical current tests up to 2 kA

Various orientations in magnetic fields up to 19 T/21 T and variable temperatures

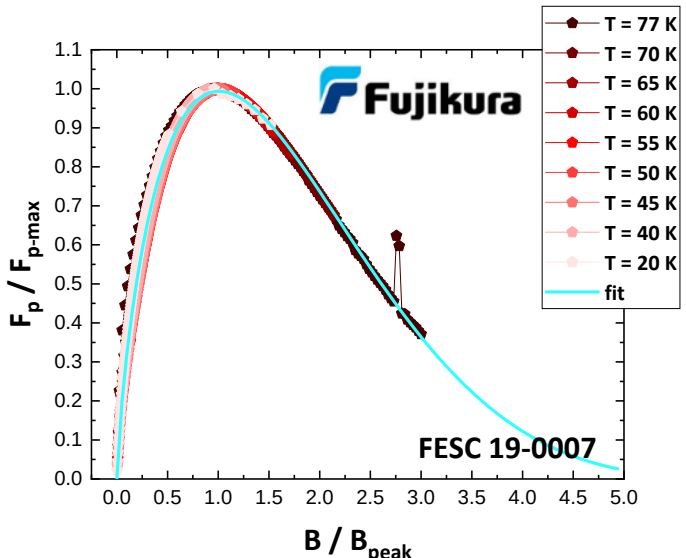
Angular dependence of I_c



Comparison of I_c / width – high performance tapes

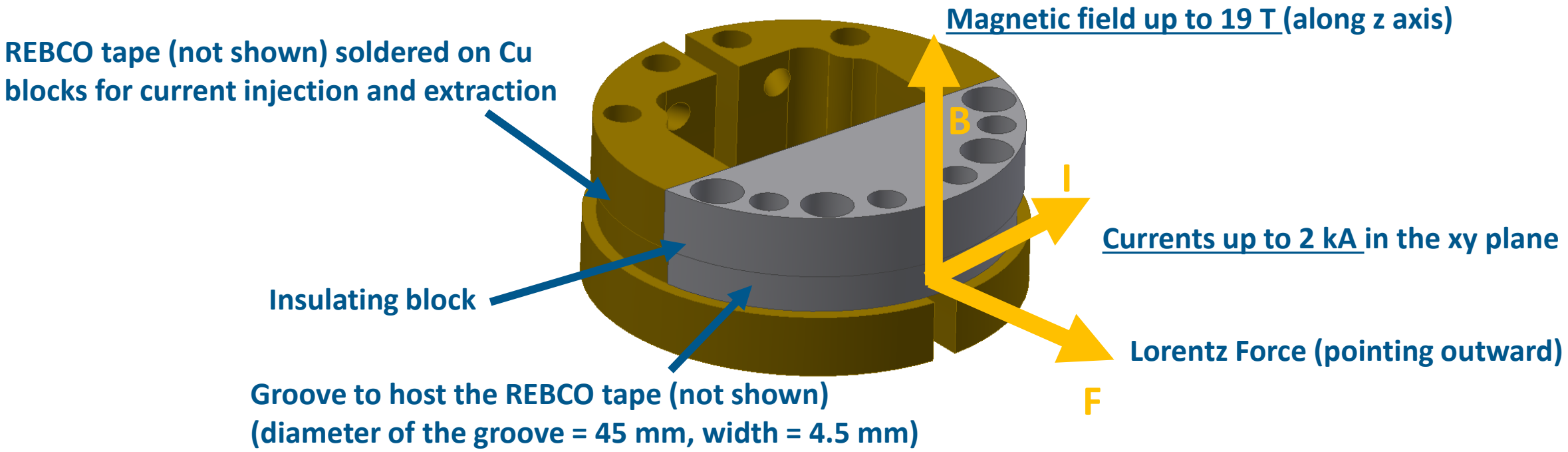


Pinning force scaling



Delamination strength measurements under I x B force

A novel experiment for a direct measurement of the conductor degradation



- The REBCO tape is mounted with the superconducting layer outward
- The Lorentz force is outward and tends to detach the REBCO layer from the substrate
- A transverse stress in the range 1 – 10 MPa is generated