

REBCO Coatings for High-Gradient RF Applications

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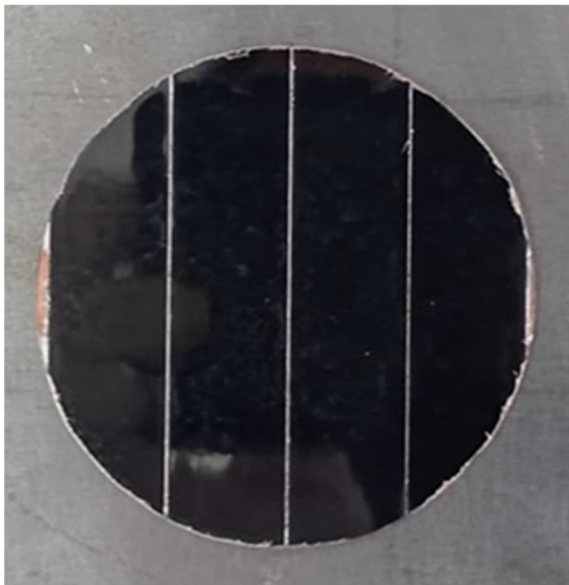


Figure 1 – Example of a disc sample for high-gradient RF testing prepared with soldered REBCO coated tapes.

This study aims at demonstrating the possibility of using REBCO superconducting coatings for high-gradient (high surface RF currents) applications, such as RF accelerator cavities.

The research is driven by recent findings demonstrating the feasibility of fabricating large-scale RF devices with REBCO surface coatings, using the technology of soldered coated conductors [1, 2]. This led to the formation of a CERN-KIT-ICMAB collaboration with SLAC as an external partner under the aegis of the iFAST EU-funded initiative based at CERN.

In this seminar, we will discuss the roadmap for this study and the possible applications of REBCO coatings in high-gradient applications, which motivate this research and which could have significant implications for RF accelerator technology. The initial results of experiments conducted in a high-gradient test stand will be presented, as a first assessment of the potential of REBCO coatings to withstand high surface RF currents.

[1] J. Golm et al., “Thin Film (High Temperature) Superconducting Radiofrequency Cavities for the Search of Axion Dark Matter”, *IEEE TAS* 32, 1500605, 2022.

[2] G. Telles et al., “Field quality and surface resistance studies of a superconducting REBa₂Cu₃O_{7-x}-Cu hybrid coating for the FCC beam screen”, *Supercond. Sci. Technol.* 36, 045001, 2023.

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