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A REBCO coating process for high-field applications

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In the initial design phase of the Future Circular Collider (FCC), concerns arose regarding high beam impedance coupling of the inner walls, posing a risk of destabilizing the particle beam due to high image current. To address this challenge, a collaborative effort with CERN led to the development of a REBCO coating process that preserves their low surface impedance [1].
This endeavor extends beyond the FCC, offering significant benefits to various high-field applications. Notably, it has been demonstrated to enhance the quality factor of RADES's axion dark-matter haloscopes [2]. Moreover, our coatings hold potential for enabling RF-cavities to operate at higher acceleration voltages by substantially reducing ohmic power loss in cavity walls, an aspect currently under investigation in partnership with SLAC.
Here we focus on the optimization of coating quality for non-flat geometries, achieved through a novel approach of delaminating coated conductors before soldering. We will examine this methodology across multiple contexts, including RADES's axion haloscopes, a prototype of the FCC's beam screen, and a decagonal cavity constructed for investigating the photodesorption of REBCO in collaboration with KEK.

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