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Coating the FCC-hh beam screen chamber with REBa₂Cu₃O_{7-x} coated conductors

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The beam screen chamber of the Future Circular Collider-hh will be operating at conditions of 40-60K, 16T and 0-1GHz proton bunch frequency. Under these conditions, Cu coating technology might not guarantee an impedance sufficiently low for a stable beam. Recently, we have shown that the surface resistance of REBa₂Cu₃O_{7-x} Coated Conductors (CCs) out performs that of copper at 8 GHz, 50 K and up to 9 T. Moreover, according to the rigid fluxon model, this trend will be more accentuated at 1 GHz. For this reason, CCs are a solid candidate to replace copper as the beam screen coating of the Future Circular Collider-hh.

The challenge now remains on how to attach a coated conductor on the FCC beam screen chamber steel. In this contribution we present a scalable technology that allows us to attach the CC to the FCC beam screen chamber stain less steel using low temperature welding. We present the first results of the surface resistance, superconducting and mechanical properties (bending radius and tensile stress tests) and vacuum tests of a CC / stainless steel stack, showing that the stack still presents a lower surface resistance than Cu at 8 GHz, 50 K and up to 9 T.

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