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Frequency and Temperature Dependence of High-Temperature Coated-Conductors Surface Resistance

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High temperature superconductors-coated conductors (HTS-CC) with its significantly low surface impedance at low temperature (below superconducting critical temperature T_c) are being considered a good alternative to Cu as coatings for the beam screen of the hadron-hadron future circular collider (FCC-hh). In particular, rare-earth barium cuprates (REBCO-CC) are excellent candidates considering its commercial availability in km lengths and appropriate widths. Several studies have been performed to study its surface impedance as a function of temperature, ac magnetic field that mimics the image current, as well as under the influence of an external dc magnetic field. Its frequency dependence at frequencies of interest for the FCC-hh, however, has yet to be studied. We will present the frequency dependence of various available REBCO-CCs in the frequency range between 6 and 30 GHz, as a function of temperature. The data allows the determination of the depinning frequency as well as of the flux creep factor as well as will allow to estimate beam impedance as a function of frequency.

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