

MULTILAYER COATINGS: OPPORTUNITIES AND CHALLENGES.

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Abstract

The use of multilayer coatings may enable significant increase of the breakdown fields or operating temperatures of SRF cavities by utilizing materials with the thermodynamic critical field H_c higher than $H_c = 200$ mT for Nb. However, such coating materials have shorter coherence length so the significant effects of impurities or grain boundaries on the surface resistance should be understood. In this talk I'll analyze the dynamics of penetration of vortices along grain boundaries and dissipation in a thin film coating in strong rf fields. I'll also discuss the role of impurities, in particular their contribution to the nonlinear Meissner effect which affects the surface resistance in the dirty limit. And finally I'll discuss the nonlinear response in two-band superconductors like MgB₂ in which strong rf fields can cause decoupling of bands at fields $H < H_c$, which can contribute to the high-field Q slope.

**CONTRIBUTION NOT
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