

RF OSCILLATIONS OF ABRIKOSOV VORTICES AND RELATED SURFACE RESISTANCE IN THE MIXED STATE OF NANOSTRUCTURED SUPERCONDUCTING FILMS

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Abstract

Implantation of dielectric nanoparticles or point-like radiation defects in the interior of high- T_c superconductor (HTS) can significantly improve its characteristics at microwave frequencies. Namely, this nanotechnological treatment allows to decrease the microwave surface resistance, R_s , in the Meissner state and eliminate Abrikosov vortices oscillations and related energy losses in the mixed state of the film, thus decreasing the Abrikosov vortices contribution to the R_s value in the mixed state of HTS film. In the present work rf-oscillations of elastic vortex strings, as well as their contribution to the microwave surface resistance, are considered for the mixed state of superconducting film with implanted nanoparticles, providing point-like and extended linear pinning sites for oscillating vortices.

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