Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Reduction of dissipative nonlinear conductivity of superconductors by static and microwave magnetic fields[1] ALEXANDER GUREVICH, Old Dominion University — A theory of dissipative nonlinear conductivity, $\sigma_1(\omega, H)$, of s-wave superconductors under strong electromagnetic fields at low temperatures and frequencies $\hbar\omega \ll k_B T$ is proposed. Closed-form expressions for $\sigma_1(H)$ and the surface resistance $R_s(\omega, H)$ are obtained in the nonequilibrium dirty limit for which $\sigma_1(H)$ has a significant minimum as a function of the amplitude of magnetic field H. The calculated microwave suppression of $R_s(H)$ is in good agreement with recent experiments on alloyed Nb resonator cavities. It is shown that superimposed dc and ac fields, $H = H_0 + H_a \cos\omega t$, can be used to reduce ac dissipation in thin film nanostructures by tuning $\sigma_1(H_0)$ with the dc field, consistent with experiments performed in the sixties.

[1]Supported by DOE HEP under grant No. DE-SC0010081.

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Date submitted: 14 Nov 2014 Electronic form version 1.4