

Magnetic Studies of Nonlocal Electrodynamics in Single Crystal $\text{YNi}_2\text{B}_2\text{C}$

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After a brief review of standard, local London electrodynamics, the nonlocal generalization of London theory by V.G. Kogan will be presented. The theory provides a good description of magnetic studies of the equilibrium magnetization of the tetragonal superconductor $\text{YNi}_2\text{B}_2\text{C}$. The single crystal possessed a long electronic mean free path, as is necessary for nonlocal effects to occur. We contrast local and nonlocal analyses of the magnetization, and examine the resulting parameters to verify that they behave according the theory. For the magnetic field in the basal plane, the magnetization exhibits a 4-fold periodicity that is quite consistent with theoretical predictions and band structure calculations. Finally, we show that the vortex pinning in the basal plane also exhibits a 4-fold periodicity arising from nonlocal effects.