

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Exact summation of vertex corrections to the penetration depth in d -wave superconductors ANDREW IYENGAR, University of British Columbia, MARCEL FRANZ — In high-purity YBCO single crystals, the impurity scattering may be dominated by slowly varying potentials due to dopant oxygen atoms. A d -wave superconductor presents an unusual situation in which such extended disorder potentials are essentially unable to change the charge current carried by nodal quasiparticles. We find that the inclusion of the important vertex corrections leads to a remarkably simple relationship between the normal fluid density and the quasiparticle density of states in the disordered system. This result is extremely general and allows the interpretation of the temperature dependence of the penetration depth in a model-independent fashion.

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Date submitted: 30 Nov 2004

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