Abstract Submitted
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Effects of Inhomogeneous Magnetic Correlations on the Penetration Depth in d-Wave Superconductors[1] WILLIAM ATKINSON, Trent University — The influence of static magnetic correlations on the temperature-dependent superfluid density $\rho_s(T)$ is calculated for d-wave superconductors. In self-consistent calculations, itinerant holes form incommensurate spin density waves (SDW) which coexist with superconductivity. In the clean limit, the density of states is gapped, and $\rho_s(T \ll T_c)$ is exponentially activated. In inhomogeneously-doped cases, the SDW are disordered and both the density of states and $\rho_s(T)$ obtain forms indistinguishable from those in dirty but pure d-wave superconductors, in accordance with experiments. We conclude that the observed collapse of ρ_s at $x \approx 0.35$ in underdoped \YBCO may plausibly be attributed to the coexistence of SDW and superconductivity.

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