

Theory of the Resistive Transition in Overdoped $Tl_2Ba_2CuO_{6+\delta}$

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Abstract

We show that recent measurements of the magnetic field dependence of the magnetization, specific heat and resistivity of $Tl_2Ba_2CuO_{6+\delta}$ in the vicinity of the superconducting H_{c2} imply that the vortex viscosity is anomalously small and that the material studied is inhomogeneous with small ($\sim 500\text{\AA}$) regions in which the local T_c is much higher than the bulk T_c . We show that anomalously low vortex viscosity can be derived from a microscopic model in which the quasiparticle lifetime varies dramatically around the Fermi surface, being small everywhere *except* along the zone diagonal (we call this a *cold spot*). This anomalously low vortex viscosity should lead to strong quantum fluctuations of vortices.