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Fast vortices in the cuprates? A vortex plasma model analysis of the THz conductivity and diamagnetism in $La_{2-x}Sr_xCuO_4$[1] LUCAS BILBRO, ROLANDO VALDES AGUILAR, Johns Hopkins University, GENNADY LOGVENOV, OSHRI PELLEG, IVAN BOZOVIC, Brookhaven National Labs, N.P. ARMITAGE, Johns Hopkins University — We present measurements of the fluctuation superconductivity in an underdoped thin film of$La_{1.905}Sr_{0.095}CuO_4$ using time-domain THz spectroscopy. We compare our results with the measurements of diamagnetism in a similarly doped crystal of $La_{2-x}Sr_xCuO_4$. Through a vortex-plasma model, we show that if the fluctuation diamagnetism originates in vortices, then we necessarily obtain an anomalously large vortex diffusion constant, more than 100 times larger than estimates from the Bardeen-Stephen model.

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