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Logarithmic flux flow resistivity across the cuprate phase diagram XIAOQING ZHOU, WENDELL HUTTEMA, PATRICK TURNER, DAVID BROUN, Department of Physics, Simon Fraser University, BEN MORGAN, JOHN WALDRAM, Cavendish Laboratory, University of Cambridge, DARREN PEETS, RUIXING LIANG, WALTER HARDY, DOUG BONN, Department of Physics and Astronomy, University of British Columbia — The dynamic properties of vortices in high quality $YBa_2Cu_3O_{6+x}$ and $Tl_2Ba_2CuO_{6+x}$ samples have been studied using high resolution microwave spectroscopy. The flux flow resistivity, a quantity which is intimately related to dissipation from electronic states near the vortex cores when vortices move, has been accurately measured at temperatures far below T_c, applied fields far below B_{c2} and dopings that span the entire superconducting region of the cuprate phase diagram. Here we report, for the first time, an universal logarithmic upturn in the temperature dependence of the flux-flow resistivities at sufficiently low temperature. Such upturns have strong resemblance to the "normal" resistivities of the highly underdoped cuprates and persist to the highly overdoped side, where the normal state resistivities are metallic. We suggest that this resistivity upturn is an intrinsic property of vortices in cuprates, which has strong implications for the nature of the underdoped cuprate normal state.

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