Magnetic-field-induced stripe order and a 2D vortex glass phase in \( \text{La}_{1.905}\text{Ba}_{0.095}\text{CuO}_4 \)\(^1\)

JOHN TRANQUADA, JINSHENG WEN, QING JIE, SU JUNG HAN, QIANG LI, MARKUS HUECKER, ZHIJUN XIU, LIYUAN ZHANG, GENDA GU, Brookhaven Natl Lab, M.V. ZIMMERMAN, HASYLAB, D.K. SINGH, NCNR — We have measured the resistivity parallel and perpendicular to the CuO\(_2\) planes in La\(_{1.905}\)Ba\(_{0.095}\)CuO\(_4\) \((T_c = 32\ \text{K})\) as a function of perpendicular magnetic field. We have discovered a significant regime of field and temperature where the perpendicular resistivity is finite (and large) but the parallel resistivity is zero. This regime appears to correspond to a quasi-two-dimensional vortex glass phase, a state that theory predicts cannot exist at finite temperature. It seems to be stabilized by field-induced charge and spin stripe order, which we have detected with x-ray and neutron diffraction, respectively.

\(^1\)Supported by Office of Basic Energy Sciences, US DOE, under Contract No. DE-AC02-98CH10886.

John Tranquada
Brookhaven Natl. Lab