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Enhanced charge stripe order in superconducting $La_{2-x}Ba_xCuO_4$ in high magnetic fields[1] M. HUECKER, Brookhaven National Laboratory, M. V. ZIMMERMANN, Deutsches Elektronen-Synchrotron DESY, Z.J. XU, J.S. WEN, G.D. GU, J.M. TRANQUADA, Brookhaven National Laboratory — There is mounting evidence for a proximity of the superconducting ground state in the cuprates to competing states with static spin and/or charge density modulations. One such competing state is the spin and charge stripe phase in $La_{2-x}Ba_xCuO_4$. By means of high energy (100 keV) x-ray diffraction we have studied the effect of a high magnetic field (H||c) on the charge stripe order in a broad range of doping ($0.095 \leq x \leq 0.155$). We find that the field can significantly enhance the charge stripe order, but only at temperatures and dopings where it coexists with bulk superconductivity at zero field. The field also increases stripe correlations between the planes, which can result in an enhanced frustration of the interlayer Josephson coupling. Close to the famous x=1/8 compound, where zero field stripe order is pronounced and bulk superconductivity is suppressed, charge stripe order is independent of the field. The results imply that static stripe order and three-dimensionally coherent superconductivity are competing ground states.

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