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Pressure study of local tilts and their correlation to stripe order in single crystal $La_{1.875}Ba_{0.125}CuO_4$ GILBERTO FABBRIS, Argonne National Laboratory and Washington University in St. Louis, MARKUS HÜCKER, GENDA GU, JOHN TRANQUADA, Brookhaven National Laboratory, DANIEL HASKEL, Argonne National Laboratory — The strong Tc suppression in LaBaCuO at x=0.125 is widely believed to be related to formation of static stripes, at least partially driven by a strong electron-lattice coupling in a low temperature tetragonal (LTT) phase (Tranquada et al., Nature 375, 561 (1995)). A recent high-pressure experiment appears to challenge this view as it was observed that static stripe order persists to pressures higher than required to induce LTT to HTT transition (Hucker et al., PRL 104, 057004 (2010)). We carried out high-pressure La K-edge polarized XAFS measurements in LaBaCuO (x=0.125) single crystals in a diamond anvil cell to probe local CuO6 tilts. We observe that the local tilts remain LTT-like at high pressure, even though the macroscopic structure is HTT. The results suggest a significant order-disorder component to this pressure-induced phase transition, whereby the local LTT tilts remain present in the local scale but disorder over long range resulting in HTT symmetry seen by diffraction. The result may help explain why the stripe order is largely unaffected by the LTT to HTT pressure-induced transition. Work at Argonne (BNL) is supported by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357 (DE-AC02-98CH10886).

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