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Competition between charge order and superconductivity in $\mathbf{La_{7/8}Ba_{1/8}CuO_4}$ JUNGHO KIM, A. KAGEDA, University of Toronto, G.D. GU, C.S. NELSON, Brookhaven National Laboratory, T. GOG, D. CASA, CMC-CAT, Advanced Photon Source, YOUNG-JUNE KIM, University of Toronto, UOT TEAM, BNL COLLABORATION, CMC-CAT, APS COLLABORATION — Understanding the role of stripe physics in cuprate superconductors is believed to be essential in elucidating the superconducting mechanism of the cuprates. Despite the fundamental importance of charge ordering in the cuprates, a comprehensive examination of the relationship between charge stripes and superconductivity is still lacking. We have carried out a detailed investigation of temperature and magnetic field dependence of charge order in $La_{7/8}Ba_{1/8}CuO_4$ utilizing high-resolution x-ray scattering. We find that the correlation length of the charge order exhibits unusual temperature and magnetic field dependence. Specifically, at zero field the correlation length decreases as the sample is cooled below $\sim$12K, while it increases as magnetic field is applied in the superconducting phase. These observations suggest that the size of the charge ordered region seems to be inversely correlated with superconductivity. This finding clearly shows that static charge order competes with the superconducting ground state, and supports the microscopic phase separation picture discussed by the recent μSR work.

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