Abstract Submitted
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Microstructural mechanism for attenuation of superconductivity in manganite/cuprate thin-film heterostructures[1] J.Y.T. WEI, University of Toronto and Canadian Institute for Advanced Research, H. ZHANG, University of Toronto, N. GAUQUELIN, G.A. BOTTON, Canadian Centre for Electron Microscopy and McMaster University — Anomalously long-ranged proximity effects have recently been reported in manganite/cuprate heterostructures, and attributed to spin-triplet correlations for odd-frequency pairing. To elucidate this exotic scenario microscopically, we studied multilayer $La_{2/3}Ca_{1/3}MnO_3/YBa_2Cu_3O_{7-\delta}$ (LCMO/YBCO) thin films using scanning transmission electron microscopy (STEM), x-ray diffraction (XRD) and electrical transport [1]. The atomic-scale STEM data revealed double CuO-chain intergrowths which effectively form regions with the 247 lattice structure in the YBCO layer. These nanoscale 247 regions do not show up in XRD, but can physically account for the reduction in superconducting critical temperature (T_c) as a function of YBCO thickness. We also observed similar T_c reduction in $LaNiO_3$/YBCO heterostructures, where $LaNiO_3$ is also epitaxially-matched with YBCO but is not ferromagnetic. These results suggest that microstructural defects, rather than magnetism, are responsible for the attenuation of superconductivity occuring in manganite/cuprate heterostructures. [1] H. Zhang *et al.*, Appl. Phys. Lett. **103**, 052606 (2013).

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