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Microscopic Study of c-axis Proximity Effect in Cuprate-Manganite Heterostructures[1] H. ZHANG, I. FRIDMAN, University of Toronto, N. GAUQUELIN, G.A BOTTON, Canadian Centre for Electron Microscopy and McMaster University, J. Y.T. WEI, University of Toronto and Canadian Institute for Advanced Research — Recent studies have reported long-ranged proximity effect in epitaxial thin-film heterostructures of ferromagnetic manganites and superconducting cuprates, with possible origins in novel spin-triplet correlations [1]. A key evidence for this effect is the suppression of the superconducting T_c observed in multilayer films of $La_{2/3}Ca_{1/3}MnO_3/YBa_2Cu_3O_{7-\delta}$ (LCMO/YBCO). However, scanning tunnelling spectroscopy on *c*-axis LCMO/YBCO bilayers have not seen direct evidence for proximity-induced pairing down to 5nm LCMO thickness [2]. We re-examine the T_c suppression by performing atomically-resolved transmission electron microscopy and resistivity measurements on *c*-axis YBCO/LCMO films grown by pulsed laser deposition, and relating the microstructure in YBCO with the layer thickness and T_c. The microscopy revealed double CuO-chain intergrowths forming non-stoichiometric YBCO-247 regions that do not appear in x-ray diffraction, but can be related to the T_c suppression. We attribute these intergrowths to heteroepitaxial strain, by comparing all the lattice parameters and symmetries involved. [1] Z. Sefrioui *et al.*, PRB 67, 214511 (2003); C. Visani *et al*, Nat. Phys. 8, 539 (2012). [2]I. Fridman *et al*, PRB 84, 104522 (2011).

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Hao Zhang
University of Toronto

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