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Oxygen Doping Study of Cuprate/Manganite Thin-Film Heterostructures[1] HAO ZHANG, YI-TANG YEN, JOHN Y.T. WEI, Department of Physics, University of Toronto and Canadian Institute for Advanced Research — Recent studies of thin-film heterostructures comprising superconducting cuprates and ferromagnetic manganites have revealed a range of novel physical phenomena [1]. These phenomena are believed to involve complex interfacial interactions between competing order parameters [2], and appear to be highly sensitive to the doping of carriers [3]. To further examine these phenomena, we carry out a systematic oxygen-doping study of $YBa_2Cu_3O_{6+x}/La_{0.67}Ca_{0.33}MnO_3$ multilayers, grown epitaxially by pulsed laser-ablated deposition. Our samples are characterized by electrical transport and magnetization measurements, as well as x-ray diffraction and various scanning microscopy probes. To assess the role of interfacial magnetism on the cuprate layer, $YBa_2Cu_3O_{6+x}$ /$LaNiO_3$ samples are also made and measured as a comparison. We also examine the effects of cation substitution in the $YBa_2Cu_3O_{6+x}$ layer, in order to determine the extent of carrier doping across the interface. [1] for example, see Z. Sefrioui et al., Phys. Rev. B 67, 214511 [2] J. Hoppler et al., Nature Materials 8, 315 [3] V. Peña et al., Phys. Rev. Lett. 97, 177005

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