

Abstract Submittal
for the March 1998 Meeting of the
American Physical Society
16-20 March 1998

Electrical Transport Studies of Spin-Injection in $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3/\text{YSZ}/\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Heterostructures* A. V. Samoilov, N.-C. Yeh, Y. Li, Department of Physics, California Institute of Technology, Pasadena, CA 91125; R. P. Vasquez, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109. - We have successfully fabricated $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3/\text{YSZ}/\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ (LCMO/YSZ/YBCO) heterostructures epitaxially grown on LaAlO_3 single-crystal substrates. We find that the superconducting transition temperature of YBCO is $T_c = 87$ K, with a transition width $\Delta T = 1$ K. The resistance of LCMO peaks near the Curie temperature $T_{\text{Curie}} = 260$ K, and drops by a factor of ~ 10 with decreasing temperature. We study the influence of spin-polarized currents injected from LCMO to YBCO on the critical current of the superconductor. The effects of Joule heating on the suppression of the critical current can be separated from those of the spin-polarized currents by independently monitoring the resistance of LCMO. We consider possible magnetic pair-breaking as a function of the magnitude of spin-polarized currents and the temperature.

*Supported by NASA/OSS