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Interaction between magnetism and superconductivity in $La_{0.7}Ca_{0.3}MnO_3/YBa_2Cu_3O_{7-\delta}$ multilayers[1] T. HU, H. XIAO, C. C. ALMASAN, Department of Physics, Kent State University, Kent, OH, 44242, USA, C. VISANI, Z. SEFRIOUI, J. SANTAMARIA, GFMC, Departamento Fisica Aplicada III, Universidad Complutense de Madrid, 28040 Madrid, Spain — Angular and field dependent magnetoresistance measurements were performed on $La_{0.7}Ca_{0.3}MnO_3/YBa_2Cu_3O_{7-\delta}$ (LCMO/YBCO) heterostructures below and above the superconducting transition temperature $T_c \approx 28$ K of the YBCO layer, in order to address the origin of the long range proximity effect found in these heterostructures. The proximity-induced conductance in the LCMO layer at $T < T_c$ increases significantly with decreasing temperature T. These magnetoresistance measurements show that the dissipation mechanism in the LCMO layer of thickness ξ_F at $T < T_c$ is due to flux vortices that have fully spin polarizes quasiparticles in the vortex core. This clearly shows that triplet superconducting pairs penetrate into the ferromagnetic LCMO layer. An estimate of $\xi_F \approx 4.7$ nm at 10 K is in excellent agreement with a previously reported value and further shows the consistency of the present analysis.

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