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Scanning Tunneling Spectroscopy Study of Bi-Layer $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3/\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Thin Films¹

I. FRIDMAN, P. MORALES, J.Y.T. WEI, University of Toronto — Recent experiments have reported long-range proximity effect in ferromagnet/superconductor (F/S) heterostructures comprised of transition-metal perovskites. To look for direct evidence of this effect, we have performed scanning tunneling spectroscopy (STS) on $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3/\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ (LCMO/YBCO) bi-layer thin films. The bi-layer films were epitaxially grown on $\langle 001 \rangle$ SrTiO_3 substrates using pulsed laser deposition. STS measurements were made at 4.2 K on bi-layer films with varying LCMO thickness (~ 20 to 60 nm) and in a magnetic field applied parallel to the film. The STS data were analyzed for spectral signatures of a pairing gap on the LCMO layer induced by the YBCO layer, to determine the length scale of the F/S proximity effect and the role played by magnetic domain walls.

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