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Spectroscopic magnetotransport across $YBa_2Cu_3O_{7-x}/La_{0.7}Ca_{0.3}MnO_3$ microjunctions JAVIER E. VILLEGAS, J. BRIATICO, R. BERNARD, M. BIBES, A. BARTHELEMY, Unite Mixte de Physique CNRS/Thales and Universite Paris Sud 11, France, C. VISANI, Z. SEFRIOUI, J. SANTAMARIA, GFMC, Departamento de Fisica Aplicada III. Universidad Complutense de Madrid, Spain — Superconducting/Ferromagnetic YBCO/LCMO heterostructures exhibit a number of novel behaviors, such as unexpected long-range proximity effects, and giant magnetoresistance. The microscopic mechanisms behind these effects are under debate and include, among others, different types of charge and spin transport processes across the YBCO/LCMO interface. Characterizing these and determining the electronic density of states nearby the interfaces is key to understand the nature of the S/F interactions. With this motivation, we have fabricated vertical YBCO/LCMO and YBCO/LCMO/YBCO junctions (of areas down to 8 μm^2) using optical lithography and ion etching. The current-perpendicular-to-plane differential conductance shows salient features such as i) a sizable interface resistivity $\sim 10^{-3}\Omega\cdot cm^2$, ii) a prominent zero-bias conductance peak, and iii) a symmetric series of resonances at quasiparticle sup-gap energies, reminiscent of Tomasch and McMillan-Rowell oscillations. We will discuss the origin of these behaviors and their implications in regard of proximity effects.

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