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Interplay between ferromagnetism and superconductivity at interfaces of $La_{0.7}Ca_{0.3}MnO_3/YBa_2Cu_3O_{7-\delta}/$ $La_{0.7}Ca_{0.3}MnO_3$ trilayers FELIO PEREZ, West Virginia University, EVAL BACCA, MARIA E. GOMEZ, Universidad del Valle, Colombia, HONGTAO SHI, Sonoma State University, DAVID LEDERMAN, West Virginia University — We report studies of $La_{0.7}Ca_{0.3}MnO_3/YBa_2Cu_3O_{7-\delta}/$ $La_{0.7}Ca_{0.3}MnO_3$ trilayers onto (001) $SrTiO_3$ substrates by high-pressure dc sputtering. We have grown heterostructures with a constant thickness of the ferromagnetic layers of 287 unit cells (110 nm) and ranging the thickness of the superconducting-middle layer between 5 (6 nm) and 15 unit cells (17 nm). The transport measurements show a strong suppression of the superconducting properties when the thickness of superconducting layer is reduced below 10 unit cells. However, the magnetic response out of plane shows the presence of the superconductor until 5 unit cells. The difference between the electrical characterization and the onset of the diamagnetic transition might to be related of presence of the spontaneous vortex phase in this temperature interval.

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