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Magnetic Exchange Between Superconducting and Ferromagnetic Oxide Layers SEAN GIBLIN, JON TAYLOR, ISIS Facility, UK, JON DUFFY, University of Warwick, UK, STEPHEN DUGDALE, University of Bristol, UK, T. NAKAMURA, SPring-8 Japan, Japan, JACOBO SANTAMARIA, Universidad de Complutense de Madrid, Spain — The origins of high temperature superconductivity and the rich phase diagrams in complex oxides are still a matter of contention that have stimulated many novel experimental studies and observations. Recently the improvement of layer by layer growth techniques of thin films has enabled investigations of both bulk and surface properties. For most common superconductors the order parameter is thought to be antagonistic to that of the exchange mechanism in ferromagnets. Accurately grown thin films have enabled these competing interactions to be probed experimentally. In particular, the growth of epitaxial oxide layers, with well-characterized atomically flat interfaces, consisting of superconducting layers of $\text{YBa}_2\text{Cu}_3\text{O}_7$ (YBCO) and lattice-matched ferromagnetic $\text{La}_{2/3}\text{Ca}_{1/3}\text{MnO}_3$ (LCMO) has flourished. Using XMCD we demonstrate that the known superexchange between Mn and Cu across the YBCO/LCMO is modified when an apparent critical thickness of the superconducting layer is reduced. All samples show an apparent exchange below the superconducting transition but above it is dependent on the YBCO thickness. Possible origins of this behaviour will be discussed.

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