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Direct measurement of charge transfer phenomena at ferromagnetic/superconducting oxide interfaces[1] MARIA VARELA, ANDREW R LUPINI, Oak Ridge National Laboratory, VANESSA PENA, ZOUHAIR SEFRIOUI, Universidad Complutense de Madrid, Spain., ILKE ARSLAN, University of Cambridge, NIGEL D. BROWNING, LBL/University of California Davis, JACOBO SANTAMARIA, Universidad Complutense de Madrid, Spain., STEPHEN J. PENNYCOOK, Oak Ridge National Laboratory — $YBa_2Cu_3O_{7-x}/La_{0.67}Ca_{0.33}MnO_3$ ferromagnetic/superconducting interfaces have been analyzed by scanning transmission electron microscopy (STEM) and electron energy loss spectroscopy (EELS) with monolayer resolution. Extensive charge transfer occurs between the manganite and the superconductor, in a manner similar to modulation-doped semiconductors, which explains the reduced critical temperatures of heterostructures. Since CMR and HTCS oxides are extremely sensitive to doping these charge transfer processes at the interfaces will directly affect the superconducting and/or magnetic properties of the individual layers. This behavior has not been observed with insulating $PrBa_2Cu_3O_7$ layers in $YBa_2Cu_3O_{7-x}/PrBa_2Cu_3O_7$superlattices. EELS in these samples provides direct confirmation that holes in the $YBa_2Cu_3O_{7-x}$ are located on the CuO_2 planes.

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