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Microscopic magnetic structure of cuprate/manganite superlattices JACQUES CHAKHALIAN, Max Planck Institute for Solid State Research, CHRISTIAN BERNHARD, JORG STREMPFER, BERNHARD KEIMER, Max Planck Institute for Solid State Research, JOCHEN STAHN, CHRISTOF NIEDERMAYER, THOMAS GUTBERLET, PSI-SINQ, Villigen, JOHN FREELAND, GEORGE SRAJER, APS-ANL, Argonne, JULIO CEZAR, ESRF, Grenoble — Superconductivity and ferromagnetism are conventionally distinguished by mutually incompatible order parameters. However, the proximity of those materials in the artificially fabricated nanofilms of $YBa_2Cu_3O_7/La_{2/3}Ca_{1/3}MnO_3$ (HTSC/FM) gives rise to new phenomena that do not exist in the isolated materials. We report on the first microscopic magnetization measurements by means of neutron reflectivity and resonant X-ray absorption. Our experimental results are consistent with the recently predicted "inverse" magnetic proximity effect. The analysis of neutron reflectivity data allows us to identify a likely magnetization profile, namely a sizable magnetic moment within the SC layer coupled antiferromagneticaly to the one in the FM layer. The scenario is supported by an anomalous superconductivity-induced enhancement of the off-specular reflection and by x-ray absorption, which testify to a strong mutual interaction of SC and FM order parameters.

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