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Direct Magnetization Measurement of the $\text{LaAlO}_3/\text{SrTiO}_3$ heterostructure LU LI, Massachusetts Institute of Technology, CHRISTOPH RICHTER, JOCHEN MANNHART, Univ. Augsburg, RAY ASHOORI, Massachusetts Institute of Technology — The $\text{LaAlO}_3/\text{SrTiO}_3$ heterostructure is a potential candidate for a high mobility two-dimensional electron system with novel electronic and magnetic properties. Although LaAlO_3 and SrTiO_3 are both large-gap band insulators, the interface is conductive and even superconducts below 200 mK. Magnetic ordering has been proposed to arise from the polarization-driven charge transfer, but the magnetization of this system has not previously been studied, likely due to the small volume of the interface. Using torque magnetometry, we detect directly the magnetic moment of the interface system. Control experiments with samples without LaAlO_3 display a background signal two orders of magnitude smaller, indicating that the observed magnetic moment arises from the deposition of LaAlO_3 . The measured equilibrium $M - H$ curve resembles that of a soft ferromagnet. Our results indicate the existence of a magnetic ordering at the two-dimensional conductive interface.

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