

## Direct imaging of coexistence of ferromagnetism and superconductivity in $\text{LaAlO}_3/\text{SrTiO}_3$ heterostructures

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We report direct magnetic imaging by scanning SQUID microscopy and susceptometry of LAO/STO heterostructures, which have been shown to support high mobility conductivity at the interface with superconductivity at low temperatures and indications of magnetism from bulk measurements in some samples. Our measurement shows ferromagnetic ordering coexisting with the diamagnetic susceptibility of the superconducting state. The superfluid density is inhomogeneous, showing regions of susceptibility which vary over a large fraction of the total response. The ferromagnetic state appears as a substantial number of dipoles and remains unchanged from 20 mK to our maximum measurement temperature of 60 K. We compare results on LAO/STO and doped  $\text{SrTiO}_3$  to confirm that the ferromagnetic order is related to the interface.