

Hysteretic Hall resistance at the LaAlO₃-SrTiO₃ interface - interplay between superconducting and ferromagnetic properties

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The conducting interface formed between the two insulators LaAlO₃ (LAO) and SrTiO₃ (STO) has been shown to have both magnetic and superconducting properties. As was reported in an earlier publication, the superconducting and the magnetic phases coexist simultaneously in this system¹, with superconductivity being tuned by an applied gate voltage. Here we report on the transverse (Hall) magnetoresistance of the interface as a function the gate voltage, which tunes the density of carriers at the interface. Not only is the Hall resistance hysteretic, due to the magnetic order in the system, but also highly non-linear in the low field region. The interaction between the superconducting vortices and the combined external and intrinsic (hysteretic) fields gives rise to the complex structure in the Hall data.²

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