

Abstract Submitted
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A Gate-tunable Polarized Phase of Two-Dimensional Electrons at the $\text{LaAlO}_3/\text{SrTiO}_3$ Interface ARJUN JOSHUA, JONATHAN RUHMAN, SHARON PECKER, EHUD ALTMAN, SHAHAL ILANI, Weizmann Institute of Science — We show using anisotropic magnetoresistance and anomalous Hall effect measurements that the $\text{LaAlO}_3/\text{SrTiO}_3$ interface has an unconventional phase diagram in the space of electron density and magnetic field. At high densities and fields we observe a polarized phase with crystalline anisotropy. Surprisingly, below a density-dependent critical field the polarization and anisotropy vanish and the resistivity sharply rises. This behavior, unobserved in other magnetic systems, indicates strong coupling between itinerant electrons and localized magnetic moments, enabling gate-tunable magnetism at this interface.

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