

Abstract Submitted
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Phase diagram of electrostatically doped SrTiO₃¹ YEONBAE LEE, STEVE SNYDER, JACK HELLERSTEDT, COLIN CLEMENT, LAURA KINISCHTZKE, JOSEPH KINNEY, ALLEN GOLDMAN, School of Physics, University of Minnesota, UNIVERSITY OF MINNESOTA TEAM — We report on the properties of electrostatically doped SrTiO₃ over broad ranges of temperature and carrier concentration. Electrostatic doping has been carried out with the use of an electric double layer transistor employing an ionic liquid as a gate dielectric. The result is an apparent carrier-density dependent metal insulator transition that may be associated with the reduction of the density of thermally excited carriers in the conduction band derived from shallow states in the band gap. This results in a phase diagram that is analogous to that found for cuprate superconductors, however, with superconductivity appearing at much lower temperatures. In addition for doping levels short of those inducing superconductivity, an anomalous Hall effect is observed, suggesting the appearance of ferromagnetism near the boundary between the insulating and superconducting regimes of the doping layer.

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