Electronic properties of the 2-dimensional LaAlO3/SrTiO3 interface

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Abstract

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The interface between LaAlO3 and SrTiO3, two good band *insulators*, which was found in 2004 to be conducting [1], and, in some doping range, superconducting with a maximum critical temperature of about 200 mK [2] is attracting of lot of attention. The electron gas has a thickness of a few nanometers at low temperatures and a low electronic density, typically 5 1013 electrons/cm2. Being naturally sandwiched between two insulators, it is ideal for performing electric field effect experiments that allow the carrier density to be tuned.

I will discuss the origin of the electron gas [3]; superconductivity [2,4]; field effect experiments and the phase diagram of the system [4]; the role of spin orbit [5,6]; the physics of high mobility samples that display Shubnikov de Haas oscillations [7], before to present recent experiments on nanostructures that reveal a remarkable tuning of the electronic properties and allow weak localization and weak anti-localization as a function of doping and temperature to be followed.

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