

Single spin-polarised Fermi surface in SrTiO₃ films

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The 2D electron gas (2DEG) formed at the surface of SrTiO₃(001) has attracted great interest because of its fascinating physical properties and promise as a novel electronic platform, but up to now has eluded a stable way to tune its properties. Using angle-resolved photoemission spectroscopy with and without spin resolution we here show that the band filling can be controlled by growing thin SrTiO₃ films on SrTiO₃(001) substrates with different Nb doping levels. This results in a single spin-polarised 2D Fermi surface in a superconducting system, which can be used as platform for Majorana physics. Based on our results it can furthermore be concluded that the 2DEG does not extend more than 3 unit cells into the film and that its properties are determined by the dielectric response of the system.

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