
Spin injection at LaAlO₃/SrTiO₃ interfaces

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Abstract

Future spintronics devices will be built from elemental blocks allowing the electrical injection, propagation, manipulation and detection of spin-based information. Owing to their remarkable multifunctional and strongly correlated character, oxide materials already provide such building blocks for charge-based devices such as ferroelectric field-effect transistors as well as for spin-based two-terminal devices like magnetic tunnel junctions, with giant responses in both cases. Until now, the lack of suitable channel materials and the uncertainty of spin injection conditions in these compounds had however prevented the exploration of similar giant responses in oxide-based lateral spin transport structures.

In this talk, we will report magnetotransport measurements and their dependence on bias and back-gate voltages that demonstrate electrical spin injection into LaAlO₃/SrTiO₃ interfaces. We will give perspectives on how to achieve spin injection with increased efficiency, as well on the implementation of efficient top gating schemes for spin manipulation.

Refs. N. Reyren et al, Phys. Rev. Lett. **108**, 186802 (2012) ; M. Bibes et al, Phil. Trans. R. Soc. A **370**, 4958 (2012)

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