
Long ranged ballistic transport in an oxide-based quantum wire

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Abstract

We use the polar nature of the interface between LaAlO₃ and SrTiO₃ to design a new type of quantum wires. The conductance in these wires is quantized with a step size consistent with spin polarization in the wire. This spin polarization combined with the spin-orbit interaction result in a long ballistic range of the order of 4mm. Our results show that the new wire can be used in future spin electronic devices and as a platform for studying new exotic fermionic orders.

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