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【625】 Transport in sub-micrometric devices at the LaAlO₃/SrTiO₃ interface

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The interface between LaAlO₃ and SrTiO₃ hosts a conducting two-dimensional electron system (2DES) characterized by several interesting properties. When the 2DES is confined in-plane to realize structures with a lateral size comparable to the characteristic length-scales of the system, mesoscopic effects emerge in electronic transport. Here, we present the properties of nanowires realized at the LaAlO₃/SrTiO₃ interface using the AFM-writing technique and hard masks of amorphous SrTiO₃. We found that their magnetoconductance show signatures of coherent transport up to 1.5 K, and that nanochannels narrower than 100 nm undergo a metal-to-insulator transition at ~30 K. We attribute this behavior to the reduced system size using a model based on the saddle-point approximation of a quantum point contact.

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