

JITCP Seminar

THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
[Thursday Morning, 11:30 am, Zoom]

Spread and erase – How electron hydrodynamics can eliminate the Landauer-Sharvin resistance

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What is the ultimate limit of conductance of a metallic device of lateral size W ? In the ballistic limit, the answer is the Landauer-Sharvin conductance, which is associated with an abrupt reduction of the number of conducting channels when going from the contacts to the device. However, the ballistic limit is not always the best-case scenario, since adding strong electron-electron scattering can take electrons to a viscous regime of transport for which "super-ballistic" flows were recently studied. In this talk, we will show that by a proper choice of geometry which resembles a "wormhole", it is possible to spread the Landauer-Sharvin resistance throughout the bulk of the system, allowing its complete elimination by electron hydrodynamics. This effect arises due to the interplay between geometry and strong electron-electron scattering, which allows for a net transfer of carriers from reflected to transmitted channels. Finally, we will discuss a recent experiment in a Corbino geometry which realizes one half of this "wormhole" geometry.

References:

Theory: Phys. Rev. Lett. 129, 157701 (2022); Experiment: Nature 609, 276–281 (2022)

Online Zoom Seminar

Thursday, May 25, 2023, 11:30 am

<https://hku.zoom.us/j/93961216791?pwd=N1lVM05lM1YvV2tZc242L0dQeGNTZz09>

Meeting ID: 939 6121 6791, Password: 25600

Host: Professor Gang CHEN, The University of Hong Kong

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