

# Anomalous thermoelectric transport near charge neutrality in electronic hydrodynamics

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We consider hydrodynamic electron transport in the Hall-bar devices, Corbino geometry, and electronic double-layers in the drag setup. The theory is developed for systems with non-Galilean-invariant electron liquids. We show that inhomogeneity of the electron density induced by long-range disorder and gating leads to mixing between the hydrodynamic transport mode and transport relative to the electron liquid. For graphene systems near charge neutrality, these effects lead to strong coupling of the hydrodynamic flow to charge transport. As a result, the effective electrical conductivity of the system may significantly exceed the intrinsic conductivity of the electron liquid. We obtain analytic expressions for the thermoelectric transport coefficients of the system as a function of density in the full crossover region between clean and disorder-dominated regimes.

[1] Phys. Rev. B 105, 125302 (2022)

[2] Phys. Rev. B 105, 155307 (2022)

[3] Phys. Rev. B 106, 125304 (2022)