

Thermoelectric of Bilayer Graphene Quantum Point Contacts

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Abstract

This work investigates thermoelectric transport in electrostatically defined quantum point contacts (QPCs) fabricated in encapsulated bilayer graphene (BLG) heterostructures. By applying gate-controlled confinement and a perpendicular displacement field, narrow one-dimensional transport channels are formed within the BLG, enabling the study of ballistic and energy-dependent electron transport. Thermoelectric measurements are performed by applying a temperature gradient across the QPC and measuring the resulting thermovoltage and Seebeck coefficient. Since the transmission probability of the QPC varies strongly with carrier energy near the Fermi level, the thermoelectric response provides a sensitive probe of subband formation, quantum confinement, and conductance quantisation. Owing to the tunable band gap and high carrier mobility of encapsulated BLG devices, these measurements offer insight into the relationship between thermal transport, quantum confinement, and the underlying electronic structure in low-dimensional systems.

References

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Figures

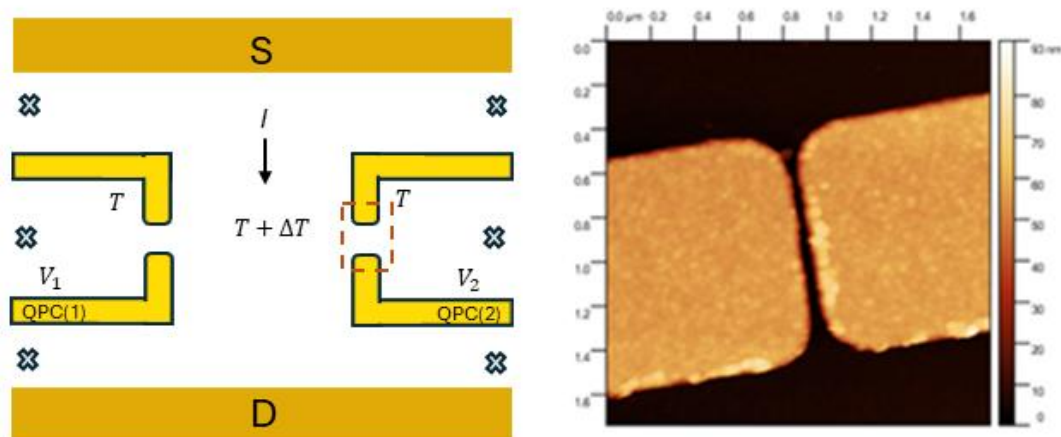


Figure 1: [left] A schematic diagram illustrates the device structure for the thermal conductivity measurements. Where V_2 is the applied voltage, I the current and ΔT temperature difference. Where the x signs are ohmic contacts. [right] an AFM characterisation of the QPC2 for 1D channel confinement.