Abstract Submitted
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Anomalous drag resistivity at charge neutrality in double-layer graphene[1] HONG-YI XIE, Univ of Wisconsin, Madison, MATTHEW FOSTER, Rice Univ, ALEX LEVCHENKO, Univ of Wisconsin, Madison — We study the Coulomb drag resistivity of Dirac carriers between two spatially-separated monolayer graphene sheets, focusing on the anomalous nonzero drag effect around dual charge neutrality that was observed in experiments in the strong interlayer interaction regime. By employing the Boltzmann equation we derive a hydrodynamic description of the electric and energy transport in double-layer graphene based on fast interlayer equilibration as well as the intralayer equilibration. Incorporating weak quenched disorder we find that the drag resistivity at dual neutrality is finite due to inelastic interlayer carrier collisions. We also discuss the magnetodrag in the hydrodynamic regime. We compute this "minimal" drag by an unbiased numerical solution to the Boltzmann equation implemented with the help orthogonal polynomials, a technique conceptually analogous to the Chapman-Enskog method introduced in the kinetic theory of gases. To simulate experiments we calculate the drag resistivity as a function of various tuning parameters such as charge densities, temperature, and interlayer distance, incorporating Coulomb impurities that is the dominant elastic scattering mechanism in graphene on h-BN substrates, and also extract analytical expressions in certain limiting cases.

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