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Non-Monotonic Temperature Dependence of Coulomb Drag Peaks in Graphene[1] DEREK HO, INDRA YUDHISTIRA, National University of Singapore, BEN YU-KUANG HU, University of Akron, SHAFFIQUE ADAM, National University of Singapore and Yale-NUS College — Coulomb drag is a direct measurement of the electron-electron interactions between two electronic layers. Graphene is a versatile electronic material with a high-degree of tunability opening up regimes that were not previously accessible. All previous theoretical studies of graphene Coulomb drag away from charge neutrality assume a spatially homogeneous carrier density which gives a peak in the Coulomb drag that decreases with temperature in contradiction to available experimental results. In this work [1], we develop an effective medium theory for Coulomb drag and show that including spatial inhomogeneity in the carrier density gives rise to a non-monotonic temperature dependence of the drag peaks that is in quantitative agreement with experimental data. Our results also show that at double-charge neutrality, there is a large negative momentum drag for correlated density fluctuations that competes with energy drag and is also non-monotonic with temperature. Lastly, we show that correlations between the density fluctuations in the two layers give rise to a violation of Onsager reciprocity between the active and passive layers. [1] D. Y. H. Ho, I. Yudhistira, B. Y.-K. Hu, and S. Adam, arXiv: 1611.03089 (2016).

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