

Abstract Submitted
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Hydrodynamical Modes and New Transport Phenomena in Graphene: Nonlocality and Anomalous Drag LEONID LEVITOV, MIT —

The semimetal band structure of graphene gives rise to an unusually strong coupling between electrical currents and charge-neutral currents. This coupling leads to new transport phenomena mediated by neutral modes. This talk will highlight two examples connected with ongoing experiments. One is giant nonlocality observed in electric measurements.[1] This effect was explained by spin transport made possible by novel spin-Hall response near the Dirac point.[2] Another example is anomalous drag observed at charge neutrality which was attributed to the effects mediated by energy transfer in graphene heterostructures.[3,4] Drag measurements thus afford a unique probe of energy transfer at the nanoscale, a fundamental process which is not easily amenable to more conventional techniques such as calorimetry, and is key for the physics of strong interactions that occur near neutrality.

[1] D. A. Abanin et al, Science 332, 328-330 (2011);

[2] D. A. Abanin et al, Phys. Rev. Lett. 107, 096601 (2011)

[3] R. V. Gorbachev et al, arXiv: 1206.6626, doi:10.1038/nphys2441

[4] J. W. C. Song and L. S. Levitov, arXiv:1205.5257, Phys.Rev.Lett., to be published (2012)

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