Abstract Submitted
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Giant Nonlocal Photocurrent at the Charge Neutrality Point in Graphene[1] QIONG MA, NATHAN GABOR, NITYAN NAIR, Department of Physics, MIT, WENJING FANG, JING KONG, Department of Electrical Engineering and Computer Science, MIT, PABLO JARILLO-HERRERO, Department of Physics, MIT — Graphene based photosensitive devices have attracted considerable attention due to monolayer graphene's broadband optical absorption and gate tunable capacities. As the quality of graphene increases, emergent phenomena are being observed in both transport and optical measurements. Here we report measurements of giant nonlocal photocurrent that emerges at the charge neutrality point in graphene transistor devices. Scanning photocurrent imaging of uniformly undoped monolayer graphene transistors reveals highly ordered spatial patterns with alternating photocurrent signs as a function of laser position. The charge density dependence of the photoresponse, combined with in-situ improvement of device mobility, reveals a strong correlation between the nonlocal photocurrent and the derivative of the thermopower as a function of charge density. Photocurrent enhancement is pronounced in high-mobility devices and at intermediate temperatures. Such behaviors are suggestive of phonon drag effects that emerge at the charge neutrality point under photoexcitation.

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