Abstract Submitted
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Quantum Hall effect in suspended graphene: two-lead versus Hall bar geometry[1] I. SKACHKO, F. DUERR, A. LUICAN, E.Y. ANDREI, Rutgers U., X. DU, SUNY SB, D. ABANIN, Princeton U. — Following our observation of the Fractional Quantum Hall effect in suspended graphene [1], we investigate why the Quantum Hall effect in this system can be observed in a two-lead geometry but not in a Hall bar geometry. By comparing magnetotransport data obtained from nonsuspended graphene Hall bar samples having various distances between voltage and current leads, we conclude that the Hall voltage is shorted out when the corresponding voltage leads are in the so called hot spot region in the immediate vicinity of current leads. We evaluate the distribution of electric field lines in the device and estimate the extent of the hot spots. We argue that due to the small size of suspended graphene devices imposed by the requirement of mechanical stability, the voltage leads are affected by the hot spots, limiting the usefulness of the Hall bar geometry. We will discuss ways to circumvent hot-spot related shorting of the Hall voltage in samples with various geometries.

[1] X. Du, I. Skachko, F. Duerr, A. Luican and E.Y. Andrei, Nature **462**, 192-194 (2009).

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