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Suspended graphene electromechanics in quantum Hall regime

VIBHOR SINGH, GANESH SUBRAMANIAN, BUSHRA IRFAN, HARI SOLANKI, MANDAR DESHMUKH, Tata Institute, Mumbai, India — There has been a keen interest in the NEMS community in probing the coupling between charge and mechanical degrees in NEMS resonators. These experiments show that electron transport and mechanical motion of the resonator influence each other. Motivated by this, we have probed the electron transport in the ultra clean graphene devices in quantum Hall regime at low temperature while it is mechanically perturbed. There can be several mechanisms that can lead to the resistance change due to mechanical vibrations like, by strain due to deformation of the flake, redistribution of the carrier density etc, electron scattering within the flake due to changes in the energy landscape. In our study we find that upon mechanical vibrations the resistance of the device changes. We try to understand these changes caused by the non-linear dependence of resistance on carrier density.

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