Abstract Submitted
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Valley Hall Effect in the presence of strain fluctuation in graphene systems[1] WENYU SHAN, DI XIAO, Carnegie Mellon University — We develop a theory of valley Hall transport in graphene on hexagonal boron nitride substrate, where the strain-induced random gauge potential becomes the dominant source of disorder. We find a large value (if not quantized) of valley Hall conductivity in the band transport regime, for a wide class of strain-fluctuation modes. Such exotic property is a consequence of a generic enhanced coordinate shift under vector disorder scattering for Dirac systems. When applied to monolayer or bilayer graphene, our theory reproduces the large valley Hall angle and finite-temperature behaviors of valley Hall conductivity observed in experiments. Our theory provides an alternative interpretation of experimental results for nonlocal transport in graphene, instead of previous understanding based on the equilibrium current in ground state.

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