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Inelastic vertical tunneling in graphene-based heterostructures[1]
SERGIO DE LA BARRERA, RANDALL FEENSTRA, Carnegie Mellon University, Department of Physics — Lateral momentum conservation of tunneling states in graphene / hexagonal boron nitride / graphene heterostructures causes intriguing resonant behavior and negative differential resistance. We explain this phenomenon in terms of a simple model which includes electrostatic gating, rotational alignment between graphene layers, elastic scattering, and inelastic tunneling effects for both monolayer and bilayer graphene. We highlight recent experimental efforts to observe these effects in fabricated devices[2] and compare with theory to validate our theoretical model. In order to improve future fabrication, we discuss disorder mechanisms, the differences between monolayer and bilayer graphene configurations, and the critical parameters which govern the characteristics of these devices.

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[2]Mishchenko et al., Nat. Nano. **9**, 808 (2014).

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