Abstract Submitted
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Electron-phonon coupling in bilayer and single-layer graphene at sub-Kelvin temperatures[1] CHRIS MCKITTERICK, Yale University, Department of Physics, HELI VORA, XU DU, Stony Brook University, Department of Physics, MICHAEL ROOKS, Yale Institute for Nanoscience and Quantum Engineering, DANIEL PROBER, Yale University, Department of Physics — Graphene has been proposed by many groups as a detector of terahertz photons[1,2,3], due to its very small heat capacity and predicted low thermal conductance. We present Johnson noise thermometry measurements of single and bilayer graphene samples fabricated at Stony Brook University and at Yale University. These measurements probe the graphene electron-phonon coupling at sub-Kelvin temperatures. The devices are fabricated with superconducting contacts (NbN at Stony Brook, Al and Nb at Yale) to confine the hot electrons in the graphene device, diminishing the contribution of electron out-diffusion in cooling the electron system. By using commercially-available CVD-grown graphene for some samples, we can define large area sections, allowing us to emphasize the thermal conductance due to electron-phonon coupling. These measurements allow for performance estimates for using similar graphene devices to detect terahertz photons.

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