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Tuning electron-phonon interactions in graphene and its bilayer for sensitive bolometry HELI VORA, BENT NIELSEN, XU DU, Department of Physics and Astronomy, Stony Brook University — Graphene's weak electron-phonon coupling and small electronic heat capacity are of considerable advantage for achieving highly sensitive bolometers and fast single photon detectors. Minimizing electron phonon coupling in graphene can be utilized for designing state-of-the-art bolometers. For such purpose, it is important to understand electron-phonon interaction and its dependence on temperature, Fermi energy, disorder and number of layers experimentally. In particular, single and bilayer graphene are expected to show opposite Fermi energy dependence of electron phonon coupling constant. We study graphene-superconductor tunnel junctions, where the superconducting contacts effectively confine the hot electrons inside the graphene absorber, allowing access to phonon cooling regime at low temperatures. We show results on the temperature and doping dependence of electron-phonon coupling in graphene and its bilayer.

Heli Vora
Department of Physics and Astronomy, Stony Brook University

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