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Graphene-Superconductor hybrid device as Bolometer HELI VORA, NAOMI MIZUNO, PIRANAVAN KUMARAVADIVEL, BENT NIELSEN, XU DU, Department of Physics and Astronomy, Stony Brook University — Low electronic heat capacity and small achievable volume has made graphene a promising candidate for a fast and sensitive bolometric detector. In our device scheme, in addition to low electron-phonon coupling we can further limit out-diffusion of hot electrons from graphene into the leads by placing tunnel-type superconducting contacts on graphene and preventing tunneling through the oxide barrier into the superconducting gap. We fabricate NbN contacts on graphene with a sandwich layer of titanium oxide tunnel barrier. Due to high dielectric constant of titanium oxide, our design allows device impedance matching with the antenna circuitry at THz frequencies, necessary to achieve practical device efficiency. We present our measurements of bolometric characteristics of thermal conductance, Noise equivalent Power (NEP) and responsivity for such a device.

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