Abstract Submitted
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Design and fabrication of an antenna-coupled graphene terahertz mixer[1] EDWARD LEONG, Univ of Maryland-College Park, JAKE CONNERS, CHEUK-YU E. TONG, PAUL K. GRIMES, LINGZHEN ZENG, Harvard-Smithsonian Center for Astrophysics, MARTIN MITTENDORFF, THOMAS E. MURPHY, Univ of Maryland-College Park — Graphene has shown promise for tunable terahertz (THz) technology, including detectors, modulators, filters, and emitters. Graphene exhibits a significant change in conductivity when the Fermi energy is altered by applying a gate voltage. Near the Dirac point, graphene field effect transistors (FETs) show a strongly nonlinear response (i.e. a strong change in resistivity with applied voltage) that can be exploited to provide efficient rectification and mixing of THz signals. Although rectification in graphene field-effect transistors has been demonstrated, heterodyne mixing in the THz band has not been explored. We examine a THz graphene mixer using an antenna-coupled graphene FET configuration. We will discuss the antenna and graphene device design optimized for heterodyne mixing 0.35 THz. In addition, fabrication and preliminary measurements of a lower frequency prototype will be presented to demonstrate the principle of the operation.

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