Abstract Submitted
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Graphene optical-to-thermal converter[1] ALEJANDRO MANJAVACAS, Rice University, SUKOSIN THONGRATTANASIRI, Kasetsart University, JEAN-JACQUES GREFFET, Institut d'Optique, Univ. Paris Sud, JAVIER GARCIA DE ABAJO, ICFO-The Institute of Photonic Sciences — Infrared plasmons in doped graphene nanostructures produce large optical absorption that can be used for narrow-band thermal light emission at tunable frequencies that strongly depend on the doping charge. By virtue of Kirchhoff's law, thermal light emission is proportional to the absorption, thus resulting in narrow emission lines associated with the electrically controlled plasmons of heated graphene. Here [1] we show that realistic designs of graphene plasmonic structures can release over 90% of the emission through individual infrared lines with 1% bandwidth. We examine anisotropic graphene structures in which efficient heating can be produced upon optical pumping tuned to a plasmonic absorption resonance situated in the blue region relative to the thermal emission. An incoherent thermal light converter is thus achieved. Our results open a new approach for designing tunable nanoscale infrared light sources.

[1] A. Manjavacas, S. Thongrattanasiri, J. J. Greffet, and F. J. Garcia de Abajo, Appl. Phys. Lett. (2014).

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Alejandro Manjavacas
Rice University

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