

Abstract Submitted
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Drude weight, cyclotron resonance, and the Dicke model of graphene cavity QED¹ MARCO POLINI, NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, LUCA CHIROLLI, VITTORIO GIOVANNETTI, NEST, Scuola Normale Superiore and Istituto Nanoscienze-CNR, ALLAN MACDONALD, Department of Physics, University of Texas at Austin, Austin, Texas 78712, USA — The unique optoelectronic properties of graphene make this two-dimensional (2D) material an ideal platform for fundamental studies of cavity quantum electrodynamics (QED) in the strong-coupling regime. The celebrated Dicke model of cavity QED can be approximately realized in this material when the cyclotron transition of its 2D massless Dirac fermion carriers is nearly resonant with a cavity photon mode. In this talk I will discuss the theory of strong matter-photon coupling in this circumstance, emphasizing the essential role of a dynamically generated matter energy term that is quadratic in the photon field and absent in graphene's low-energy Dirac model.

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Marco Polini
NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore

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