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Nonlinear photoluminescence from graphene[1] WEITAO LIU, Physics Department, University of California at Berkeley, CA 94720, S. W. WU, P. J. SCHUCK, M. SALMERON, The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, Y. R. SHEN, F. WANG, Physics Department, University of California at Berkeley, CA 94720 — Upon femtosecond laser irradiation, a bright, broadband nonlinear photoluminescence (PL) is observed from graphene at frequencies well above the excitation frequency. Analyses show that it arises from radiative recombination of a broad distribution of non-equilibrium electrons and holes, generated by rapid scattering between photo-excited carriers within tens of femtoseconds after the optical excitation. Its highly unusual characteristics come from the unique electronic and structural properties of graphene.

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Weitao Liu
Physics Department, University of California at Berkeley, CA 94720

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