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Third harmonic generation in graphene NARDEEP KUMAR, JATINDER KUMAR, CHRIS GERSTENKORN, Department of Physics and Astronomy, The University of Kansas, RUI WANG, Department of Physics and Astronomy, The University of Kansas; Laboratory for Photonics and Quantum Electronics, University of Iowa, HSIN-YING CHIU, Department of Physics and Astronomy, The University of Kansas, ARTHUR SMIRL, Laboratory for Photonics and Quantum Electronics, University of Iowa, HUI ZHAO, Department of Physics and Astronomy, The University of Kansas — We report the measurement of optical third harmonic generation from single-layer graphene and few-layer graphite flakes produced by exfoliation. In the measurements, femtosecond near-infrared laser pulses were used to irradiate the samples. The emission observed scales with the cube of the intensity of the incident near-infrared pulse and with one third of the incident wavelength - both are clear evidences of third harmonic generation. We deduced an effective third-order susceptibility for single layer graphene to be on the order of 10^{-16} m^2/V^2. By measuring a set of flakes with different numbers of atomic layers, we found that for a few layers, the emission scales with the square of the number of atomic layers.

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