

Abstract Submitted
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Layer-Dependent Third-Harmonic Generation in Graphene¹ HAO YANG, Columbia Univ, HONGHUA GUAN, Johns Hopkins University, JERRY DADAP, RICHARD OSGOOD, Columbia Univ, RICHARD OSGOOD TEAM — Graphene has become a subject of intense interest and study because of its remarkable 2D electronic properties. Multilayer graphene also offers an array of properties that are also of interest for optical physics and devices. Despite its second-order nonlinear optical response is intrinsically weak, third-order nonlinear optical effects in graphene are symmetry-allowed thus leading to studies of several third-order process in few-layer graphene. In this work, we report third-harmonic generation in multilayer graphene mounted on fused silica and with thicknesses which approach the bulk continuum. THG signals show cubic power dependence with respect to the intensity of fundamental beam. Third-harmonic generation spectroscopy enables a good fit using linear optical detection, which shows strong contrast for different layer number graphene. The maximum THG efficiency appears at layer number around 30. Two models are used for describing this layer dependent phenomenon and shows absorption plays a key role in THG of multilayer graphene. This work also provides a new imaging technology for graphene detection and identification with better contrast and resolution.

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