

Abstract Submitted
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Probing Non-equilibrium Phonon Dynamics in Graphite by Time-Resolved Raman Spectroscopy HUGEN YAN, Columbia University, DAOHUA SONG, KIN FAI MAK, IOANNIS CHATZAKIS, JANINA MAULTZSCH, TONY HEINZ — Time-resolved Raman spectroscopy has been applied to obtain direct information about phonon lifetimes in graphite. A non-equilibrium population of zone-center optical phonons was produced by the rapid relaxation of charge carriers following photoexcitation of the sample with a femtosecond laser pulse. The subsequent evolution of the phonon population was recorded using the strength of G-mode anti-Stokes Raman scattering from a time-delayed femtosecond probe pulse. A population lifetime for the G-mode phonons of approximately 2 ps was found. Analogous measurements of optical-phonon lifetimes were also conducted in few-layer graphene samples produced by mechanical exfoliation of bulk graphite. Results obtained for graphite and few-layer graphene will be compared with one another, as well as with earlier data on the lifetime of G-mode phonons in single-walled carbon nanotubes [1].

[1] D. Song, F. Wang, G. Dukovic, M. Zheng, E. D. Semke, L. E. Brus, and T. F. Heinz, submitted.

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