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Probing dynamics in graphene with infrared spectroscopy[1]

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Infrared and far-infrared spectroscopy provides an attractive approach for examining the properties of charge carriers in solids. For the case of graphene, while these possibilities had been recognized, experiments were hindered by the lack of samples of sufficient lateral extent to be probed by standard far-field techniques. Now, with the advent of high-quality graphene grown by chemical vapor deposition (CVD), researchers are able to overcome these limitations. Analysis of optical conductivity by infrared spectroscopy provides direct information about the carrier scattering rate, as well as the intraband and interband transition strength in graphene. Furthermore, when combined with a femtosecond excitation pulse, time-resolved terahertz (or far-infrared) spectroscopy allows us to probe the ultrafast relaxation dynamics of electrons in graphene. In this talk, I will discuss recent results on infrared spectroscopy and dynamics studies of CVD graphene, with an emphasis on identifying the role of electron-phonon and electron-electron interactions and the influence of doping on these interactions.

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