Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Phonon coupling and disorder induce infrared optical transparency in graphene BRUNO ROUSSEAU, Université de Montréal, FRANÇOIS LAPOINTE, Fritz-Haber-Institut der Max-Planck-Gesellschaft, MICHEL CÔTÉ, RICHARD MARTEL, Université de Montréal — Recent infrared spectroscopy measurements of doped graphene grafted with iodophenyl moieties have revealed fairly narrow transmission windows which vary as a function of the chemical potential, in contrast to the featureless, Drude-like spectrum of pristine graphene in this frequency range. These asymmetric windows appear at energies corresponding to phonon modes near the Γ and K points. We propose a model which involves coherent intraband scattering with defects and phonons, thus relaxing the optical selection rule forbidding access to $\mathbf{q} \neq \mathbf{\Gamma}$ phonons. Numerical simulations based on the model reproduce the features of the experimental observations (number of bands, energies, variation in energy and intensity with respect to chemical potential).

Bruno Rousseau
Université de Montréal

Date submitted: 11 Nov 2014 Electronic form version 1.4