

## Interaction effects in the magneto-Raman scattering response of graphene

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Magneto-Raman scattering studies of graphene-like locations on the surface of bulk graphite will be reported. The high electronic quality of this system allows for the direct observation of inter Landau level electronic excitations [1] up to  $5000\text{ cm}^{-1}$  from the laser line, which can be tuned, due to the use of high magnetic fields, over most of the phonon features visible in the Raman scattering response of graphene. A detail investigation of the Raman scattering response of this system reveals new effects of electron-phonon interaction, which imply not only the  $E_{2g}$  phonons (magneto-phonon resonance [2,3]), but also K-point phonons as well as  $2\Gamma$  point phonons. Resonant electron-phonon interaction with these three phonon modes is evidenced in magnetic field highlighting the role of combined excitations and the one of multiple phonon scattering as an important electron relaxation process. These results are analyzed in the frame of multimode interaction involving up to three distinct excitations.

In a second part, I will present the magneto-Raman scattering response of a graphene on BN hybrid structure. Such structures present high electronic quality with a Fermi level close to charge neutrality point. The magneto-phonon resonance in this quasi neutral system will be discussed together with the presentation of its response due to purely electronic excitations.

[1] C. Faugeras et al., Phys Rev. Lett. 107 (2011) 036807

[2] C. Faugeras et al., Phys. Rev. Lett. 103 (2009) 186803

[3] J. Yan et al., Phys. Rev. Lett. 105 (2010) 227401

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