Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Effect of doping on the Raman lineshape and intensity of graphene CINZIA CASIRAGHI, Freie Universität Berlin, DENIS M. BASKO, Université Joseph Fourier and CNRS, Grenoble, ANDREA C. FERRARI, Cambridge University, UK — Graphene can be doped by applying a gate voltage [1-2]. Doping strongly affects the G and 2D Raman peaks: i) the G peak upshifts for increasing doping, while its width decreases [1]; ii) the 2D upshifts for p-doping, while it downshifts for n-doping [2]. iii) the ratio between the 2D and G peaks intensity decreases for increasing doping [2]. The 2D intensity is strongly affected by the electron-electron scattering rate, which increases with doping [3]. Similar Raman peaks variations were observed for non-gated samples, as an effect of charged impurities [4]. Here we use the 2D peak intensity variation with doping to extract the electron-phonon scattering rate [3,5]. We note that in non-gated samples, where the Fermi level shift is induced by charged impurities, we can probe the 2D peak dependence much closer to the Dirac point than in gated ones [5]. We find an electron-phonon coupling scattering rate of 60 ps^{-1} at 2.41 eV excitation energy [3,5].

[1] S. Pisana et al, Nature Mat. 6, 198 (2007)
[2] A. Das et al., Nature Nanotech. 3, 210 (2008)
[3] D. M. Basko et al. PRB 80, 165413 (2009)
[4] C. Casiraghi et al., APL 91, 233108 (2007)
[5] C. Casiraghi, arXiv:0908.4480

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Date submitted: 22 Nov 2009 Electronic form version 1.4