Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Inversion symmetry breaking induced phonon-phonon anti-crossing in bilayer graphene[1] JUN YAN, THERESA VILLARSON, ERIK A. HENRIKSEN, PHILIP KIM, ARON PINCZUK, Columbia University — We use Raman scattering to study the breaking of inversion symmetry in bilayer graphene. The electron and hole doped states of the system reveal phonon band splitting with spectral intensity transfer that is tuned by a polymer electrolyte top gate. The observations suggest that the in-phase and out-of-phase long wavelength optical phonons (G bands) are coupled to each other, and are thus no longer energy eigenstates. The coupling results in an intriguing phonon-phonon anti-crossing phenomenon induced by the broken inversion symmetry. The Raman spectral transfer between the observed two normal modes offers quantitative measurements of the evolution of the phonon wavefunction and suggests that the Raman activity of the out-of-phase mode is negligibly small in the presence of the broken inversion symmetry.

[1]This work is supported by ONR, NSF, DOE and NYSTAR.

Jun Yan
Columbia University

Date submitted: 08 Dec 2009 Electronic form version 1.4