Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Application of modified phonon confinement model in Raman characterization of Ge nanowires K. ROODENKO, University of Texas at Dallas, I.A. GOLDTHORPE, P.C. MCINTYRE, Stanford University, Y.J. CHABAL, University of Texas at Dallas — Raman spectroscopy is an attractive tool for characterization of low-dimensional materials, such as carbon nanotubes, graphene sheets or semiconductor nanowires. Phonon confinement model [1,2] was proposed to interpret Raman signal obtained from low-dimensional materials. Due to the finite-size of the nanostructures, the fundamental q∼0 Raman selection rule is relaxed, allowing the contribution from phonons away from the Brillouin-zone center. In this contribution we address several unresolved issues, such as the factors within the confinement function, incorporation of crystallographic orientation, and the interplay between the temperature and the nanostructure size [3]. Application of the modified model to the interpretation of Raman signal from Ge nanowires will be discussed.

[1] H. Richter, et al., Solid State Commun. 39, 625 (1981).
[2] I. H. Campbell et al., Solid State Commun. 58, 739 (1986).
[3] K. Roodenko et al., Phys. Rev. B 82, 115210 (2010).

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Date submitted: 21 Nov 2010 Electronic form version 1.4