Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Polarized Nonresonant Raman Spectra of Graphene Nanoribbons

GUANGFU LUO, JING LU, LU WANG, LIN LAI, JING ZHOU, RUI QIN, HONG LI, ZHENGXIANG GAO, State Key Laboratory for Mesoscopic Physics and Department of Physics, Peking University, Beijing 100871, People's Republic of China, WAI-NING MEI, Department of Physics, University of Nebraska at Omaha, Omaha, Nebraska 68182-0266 — We study the non-resonant Raman scattering of armchair- and zigzag-edged graphene nanoribbons using density functional perturbation theory. We find that in both types of nanoribbon, the Raman spectrum is extremely polarized along the ribbon length direction, over 102 times larger than those of the other orientations. Also we discover that the scattering intensity of this major polarization exhibits conspicuous quantum oscillation with the ribbon width in armchair-edged nanoribbons. While in zigzag-edged nanoribbons, the Raman spectra shows relatively weak dependence on the ribbon width. We propose employing the surface-enhanced Raman spectroscopy to detect these features, a procedure which has been applied in the studies of graphene.

Wai-Ning Mei
Department of Physics, University of Nebraska at Omaha,
Omaha, Nebraska 68182-0266

Date submitted: 30 Nov 2010 Electronic form version 1.4