Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Fabrication and Detection of Graphene Nano-Mechanical Oscillators SHONALI DHINGRA, JEN-FENG HSU, BRIAN D'URSO, Department of Physics and Astronomy, University of Pittsburgh — Graphene's exceptionally high crystal and electronic quality, combined with being only one-atom thick, make it quite a sought-after material for nano-mechanics, sensing and electronics. We fabricate and characterize Nano-Mechanical Oscillators (NMO) from large-domain single-layer graphene grown with Chemical Vapor Deposition (CVD) on ∼2mm thick copper discs. The graphene is transferred from copper using Poly (methyl methacrylate) (PMMA), onto indigenous substrates customized for enhanced graphene adhesion and assistance in its optical detection. It is patterned into devices of different geometrical shapes, such as doubly clamped beams, circular drums and rectangular drums, using deep-UV lithography of PMMA, either before or after transfer. The phase and frequency response of the resonant motion of the NMO is monitored, which is electrically actuated and optically detected using interferometric techniques. These oscillators would be used as building blocks for hybrid quantum systems which couple classical oscillators with a quantum spin system.

Shonali Dhingra
Department of Physics and Astronomy, University of Pittsburgh

Date submitted: 09 Nov 2012 Electronic form version 1.4