Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Influence of size effects and substrate morphology on the conductance of epitaxial graphene nanoribbons SARAH BRYAN, YINXIAO YANG, RAGHU MURALI, Georgia Institute of Technology — To utilize graphene's superior electrical properties and achieve transistor operation comparable to that of silicon, the properties of graphene nanoribbons need to be better understood and optimized. Lithographically patterned nanoribbons suffer from line edge roughness which can result in a detrimental effect on the graphene conductivity. In addition to edge-induced scattering, the morphology of the silicon carbide substrate appears to have a strong effect on the line width scaling behavior. In this talk, we present experimental data that clearly shows the interplay between substrate morphology and line edge roughness in epitaxial graphene nanoribbons. Resistivity is shown to strongly increase as nanoribbon line width is reduced, although the line width at which this behavior sets in varies depending upon the substrate morphology. We also propose a model which can be used to predict the dependence of graphene nanoribbon resistivity on line width.

Sarah Bryan
Georgia Institute of Technology

Date submitted: 19 Nov 2010 Electronic form version 1.4