Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

A three dimensional approach to selective growth and photolithographic fabrication of graphene nanoribbon on SiC MING RUAN, MIKE SPRINKLE, XIAOSONG WU, YIKE HU, MIGUEL RUBIO-ROY, JOHN HANKINSON, School of Physics, Georgia Institute of Technology, CLAIRE BERGER, School of Physics, Georgia Institute of Technology & CNRS/Institut Neel, WALT DE HEER, School of Physics, Georgia Institute of Technology — We present a unique three-dimensional process for fabrication of epitaxial graphene devices on hexagonal silicon carbide. Pre-patterning of SiC substrate allows graphene growth on SiC crystal planes other than typical (000-1) and (0001) planes. Selective graphitization on these crystal planes are reported, which enables definition of graphene nanoribbon by standard photolithographic processing. Measurement of devices demonstrates the electronic viability of graphene grown on these SiC crystal planes and over SiC step edges, suggesting technologically practical methods of obtaining semiconducting graphene nanoribbons. Fabrication of >10,000 transistors on a 0.24cm^2 chip illustrates the scalability of this process.

Ming Ruan
School of Physics, Georgia Institute of Technology

Date submitted: 28 Nov 2009 Electronic form version 1.4