Abstract Submitted
for the 4CF15 Meeting of
The American Physical Society

Conductance Fluctuations in Graphene in the Presence of Long-Range Disorder BOBO LIU, RICHARD AKIS, DAVID FERRY, Arizona State University — The conductance fluctuations in graphene nanoribbons are investigated numerically in this work. The fluctuations arise from a long-range disorder potential induced by random impurities. As the Fermi energy and magnetic field vary, the phase interference conditions and pattern of electron waves change randomly, this leads to the conductance fluctuations. Since recent experiments show that an external perpendicular magnetic field can reduce the amplitude of the conductance fluctuations of Fermi energy sweeps, we focus on this effect in our numerical research and found a remarkable qualitative agreement with the experimental results. The numerical examination of this property is extended to GaAs nanowires and a similar effect is observed. This reduction of amplitude of conductance fluctuations of Fermi energy sweeps induced by perpendicular magnetic field can be explained by the formation of edge states in the 2D nanostructures.

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Date submitted: 14 Aug 2015 Electronic form version 1.4