Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Delocalization of disordered massless Dirac fermions in graphene
KENTARO NOMURA, Department of Physics, Tohoku University, MIKITO KOSHINO, Columbia University, Tokyo Institute of Technology, SHINSEI RYU, Kavli Institute for Theoretical Physics, University of California, Santa Barbara —
Graphene is a two-dimensional carbon material with a honeycomb lattice and Dirac-like low-energy excitations. Motivated by recent graphene transport experiments, we have undertaken a numerical study of the conductivity of disordered two-dimensional massless Dirac fermions. The beta function of the Dirac hamiltonian subject to a random scalar potential is computed numerically. Although it belongs to, from a symmetry standpoint, the two-dimensional symplectic class, the beta function monotonically increases with decreasing the dimensionless conductance. We also provide an argument based on the spectral flows under twisting boundary conditions, which shows that none of states of the massless Dirac Hamiltonian can be localized. K. Nomura, M. Koshino, S. Ryu, Phys. Rev. Lett. 99, 146806 (2007).

Mikito Koshino
Columbia University, Tokyo Institute of Technology

Date submitted: 05 Dec 2007 Electronic form version 1.4