Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Landauer conductance and twisted boundary conditions for Dirac fermions SHINSEI RYU, Kavli Institute for Theoretical Physics, University of California at Santa Barbara, CHRISTOPHER MUDRY, Paul Scherrer Institute, AKIRA FURUSAKI, RIKEN, ANDREAS LUDWIG, University of California, Santa Barbara — We apply the generating function technique developed by Nazarov to the computation of the density of transmission eigenvalues for a finite graphene sheet in which a two-dimensional freely propagating massless Dirac fermion is realized. By modeling ideal leads attached to the sample as a conformal invariant boundary condition, we relate the generating function for the density of transmission eigenvalues to the twisted chiral partition functions of fermionic (c=1) and bosonic (c=-1) conformal field theories. We also discuss the scaling behavior of the ac Kubo conductivity and compare its *different dc* limits with results obtained from the Landauer conductance. Finally, we show that the disorder averaged Einstein conductivity is an analytic function of the disorder strength, with vanishing first-order correction, for a tight-binding model on the honeycomb lattice with weak real-valued and nearest-neighbor random hopping.

Shinsei Ryu
Kavli Institute for Theoretical Physics
University of California at Santa Barbara

Date submitted: 15 Nov 2006 Electronic form version 1.4