Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Demonstration of one-parameter scaling at the Dirac point in graphene JENS H. BARDARSON, J. TWORZYDLO, P. BROUWER, C.W.J. BEENAKKER, Instituut-Lorentz, Universiteit Leiden — We numerically calculate the conductivity σ of an undoped graphene sheet (size L) in the limit of vanishingly small lattice constant. We demonstrate one-parameter scaling for random impurity scattering and determine the scaling function $\beta(\sigma) = d\ln\sigma/d\ln L$. Contrary to a recent prediction, the scaling flow has no fixed point ($\beta > 0$) for conductivities up to and beyond the symplectic metal-insulator transition. Instead, the data supports an alternative scaling flow for which the conductivity at the Dirac point increases logarithmically with sample size in the absence of intervalley scattering — without reaching a scale-invariant limit.

Jens H. Bardarson
Instituut-Lorentz, Universiteit Leiden

Date submitted: 28 Nov 2007 Electronic form version 1.4