

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Effect of Electron-Electron Scattering on the Conductance of a Single Quantum Wire¹ DANHONG HUANG, USAF Research Lab, KEN LYO, Sandia National Labs — Electron-electron scattering conserves momentum and does not dissipate momentum in a low-density system where the Umklapp process becomes forbidden. However, it can still affect the conductance through the energy relaxation of carriers. We show that this effect can be studied with an arbitrary accuracy in a multi-level single quantum wire system with impurity and phonon scattering using a formally exact solution of the Boltzmann transport equation. We study the effect of electron-electron scattering on the temperature and density dependence of the conductance at low temperatures. Some unique features in the calculated conductance as functions of the temperature and the density are predicted and physically explained.

¹Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the U.S. DOE under Contract No.DE-AC04-94AL85000.

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Date submitted: 30 Nov 2005

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