

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Equilibration of Luttinger liquid and conductance of quantum wires¹ K.A. MATVEEV, Argonne National Laboratory, A.V. ANDREEV, University of Washington — Luttinger liquid theory describes one-dimensional electron systems in terms of non-interacting bosonic excitations. In this approximation thermal excitations are decoupled from the current flowing through a quantum wire, and the conductance is quantized. We show that relaxation processes not captured by the Luttinger liquid theory lead to equilibration of the excitations with the current and give rise to a temperature-dependent correction to the conductance. In long wires, the magnitude of the correction is expressed in terms of the velocities of bosonic excitations. In shorter wires it is controlled by the relaxation rate.

¹Work supported by the U.S. Department of Energy under Contracts No. DE-AC02-06CH11357 and No. DE-FG02-07ER46452.

Konstantin Matveev
Argonne National Laboratory

Date submitted: 02 Nov 2011

Electronic form version 1.4