Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Nonlinear ac conductivity of disordered Luttinger liquids[1] BERND ROSENOW, Physics Department, Harvard University, USA, THOMAS NATTERMANN, Insitut fuer Theoretische Physik, Universitaet zu Koeln, Germany — We consider low energy charge transport in one-dimensional electron systems with short range interactions under the influence of a random potential. At zero temperature, the linear ac conductivity vanishes like $\sim \omega^2(\ln(1/\omega))^2$. Much less is known about the *non-linear conductivity*. At zero temperature and frequency, charge transport is only possible by tunneling of charge carriers, which can be described by instanton formation. The nonlinear dc conductivity is characterized by $I \sim \exp(-\sqrt{E_0/E})$ provided the system is coupled to a dissipative bath [1]. Combining RG and instanton methods, we calculate the nonlinear ac conductivity and discuss the crossover between the nonanalytic field dependence of the electric current at zero frequency and the linear ac conductivity at small electric fields and finite frequency [2].

[1] S. Malinin, T. Nattermann, and B. Rosenow, Phys. Rev. B **70**, 235120 (2004).
[2] B. Rosenow and T. Nattermann, accepted for publication in Phys. Rev. B; preprint cond-mat/0408042.

[1]Research is supported by DFG grant Ro 2247/4-1

Bernd Rosenow
Phycis Department, Harvard University

Date submitted: 30 Nov 2005 Electronic form version 1.4