Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Towards a statistical theory of transport by strongly-interacting lattice fermions** SUBROTO MUKERJEE, VADIM OGANESYAN, DAVID HUSE, Department of Physics, Princeton University — We present a study of electrical transport at high temperature in a model of strongly interacting spinless fermions without disorder. We use exact diagonalization to study the statistics of the energy eigenvalues, eigenstates, and the matrix elements of the current.These suggest that our Hamiltonian is a member of a certain ensemble of Gaussian random matrices. We calculate the conductivity $\sigma(\omega)$ and examine its behavior, both in finite size samples and as extrapolated to the thermodynamic limit. We find that $\sigma(\omega)$ has a prominent non-divergent singularity at $\omega = 0$ reflecting a power-law long-time tail in the current autocorrelation function that arises from nonlinear couplings between the long- wavelength diffusive modes of the energy and particle number.

Subroto Mukerjee
Dpeartment of Physics, Princeton University

Date submitted: 03 Dec 2004 Electronic form version 1.4