Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Warming in systems with discrete spectrum: spectral diffusion of two dimensional electrons in magnetic field[1] SERGEY VITKALOV, NATALIA ROMERO KALMANOVITZ, The City College of New York, USA, ALEXEY BYKOV, Institute of Semiconductor Physics, 630090 Novosibirsk, Russia — Warming in complex physical systems, in particular global warming, attracts significant contemporary interest. It is essential, therefore, to understand basic physical mechanisms leading to overheating. It is well known that application of an electric field to conductors heats electric charge carriers. Often an elevated electron temperature describes the result of the heating. This paper demonstrates that an electric field applied to a conductor with discrete electron spectrum produces a non-equilibrium electron distribution, which cannot be described by temperature. Such electron distribution changes dramatically the conductivity of highly mobile two dimensional electrons in a magnetic field, forcing them into a state with a zero differential resistance. Most importantly the results demonstrate that, in general, the effective overheating in the systems with discrete spectrum is significantly stronger than the one in systems with continuous and homogeneous distribution of the energy levels at the same input power.

[1]This work was supported by NSF: DMR 0349049 and RFBR, project No.08-02-01051

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Date submitted: 21 Nov 2008 Electronic form version 1.4