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Quantal Heating of 2D electrons in strong magnetic fields[1]
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— Usually heating of conducting electrons by *dc* electric field increases electron temperature and effects weakly the electron transport. In this report we show that the *dc* heating of 2D electrons with a quantized spectrum is very peculiar and violates strongly the Ohm's Law [1]. The quantal heating establishes nontrivial electron distribution, which has the same broadening or an effective "temperature" as the unbiased system. The heating reduces significantly the dissipative electron transport, forcing the quantum conductors into a state with zero differential resistance (ZDR). Furthermore an apparent *dc* driven metal-insulator transition is found, which correlates with the transition into the ZDR state. This interesting correlation is unexpected and is not understood.

[1] J.-Q. Zhang, S.A. Vitkalov and A.A. Bykov, Phys. Rev. B 80, 045310 (2009); S. A. Vitkalov, International Journal of Modern Physics B, 23, 4727 (2009).

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