Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Effects of strong electric field on acoustic phonon resonances in 2D electronic systems in high Landau levels[1] IVAN DMITRIEV, ROMAN GELLMAN, Karlsruhe Institute of Technology, MAXIM VAVILOV, University of Wisconsin - Madison — This talk will present a quantum kinetic description [1] of phonon-assisted electronic transport in crossed electric and magnetic fields in high Landau levels. It will identify quantum magnetooscillations driven by spatial and spectral resonances set by the voltage across the cyclotron diameter, by the cyclotron frequency, and by the frequency of $2k_F$ acoustic phonon which provides backscattering of electron at the Fermi surface, as observed in recent experiment [2]. The phase, magnitude, and temperature dependence of the phonon-induced magnetooscillations are shown to be very sensitive to the applied voltage or direct current. In particular, in the supersonic regime, where the Hall velocity exceeds the sound velocity, the nonlinear conductivity remains finite at zero temperature, while below the supersonic transition the oscillations get exponentially suppressed at low temperature.

[1] I.A. Dmitriev, R. Gellmann, and M.G. Vavilov, in preparation.
[2] W. Zhang, M. A. Zudov, L. N. Pfeiffer, and K. W. West, Phys. Rev. Lett. 101, 246811 (2008).

[1]This work is supported by DFG, DFG-CFN, RFBR and Rosnauka Grant No. 02.740.11.5072.

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Date submitted: 25 Nov 2009 Electronic form version 1.4