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Effect of DC electric field on longitudinal resistance of two dimensional electrons in a magnetic field[1] JING-QIAO ZHANG, SERGEY VITKALOV, The City College of New York, USA, ALEXEY BYKOV, A.K. KALAGIN, A.K. BAKAROV, Institute of Semiconductor Physics, Russia — The effect of a DC electric field on the longitudinal resistance of highly mobile two dimensional electrons in heavily doped GaAs quantum wells is studied at different magnetic fields and temperatures. Strong suppression of the resistance by the electric field is observed in magnetic fields at which the Landau quantization of electron motion occurs. The phenomenon survives at high temperature where Shubnikov de Haas oscillations are absent. The scale of the electric fields essential for the effect is found to be proportional to temperature in the low temperature limit. We suggest that the strong reduction of the longitudinal resistance is the result of a nontrivial change in the distribution function of 2D electrons induced by the DC electric field. Comparison of the data with recent theory yields the inelastic electron-electon scattering time τ_{in} and the quantum scattering time τ_q of 2D electrons at high temperatures, a regime where previous methods were not successful.

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