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Non-linear transport in a two-dimensional electron gas in magnetic fields

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Transport through high-mobility two-dimensional electron systems placed in moderate perpendicular magnetic fields shows a rich variety of phenomena, associated with a non-linear differential resistivity at strong currents, microwave-induced and phonon-induced resistance oscillations. These phenomena can be described within a quantum kinetic theory of electron transport in disorder potential within the self-consistent Born approximation. This talk will focus on magneto-oscillations of the differential resistivity in the presence of microwave radiation. A qualitative explanation of the origin of resistivity oscillations will be combined with a quantitative analysis of recent experiments. Special attention will be devoted to evaluation of a relative strength of short-scale and long-scale disorder potential and the rate of electron-electron scattering. Non-linear dependence of the differential resistivity on the power of microwave radiation will also be analyzed.