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Photoconductivity of a 2D electron gas at large filling factors
IVAN DMITRIEV, Karlsruhe, Germany, MAXIM KHODAS, Brookhaven National Laboratory, A.D. MIRLIN, D.G. POLYAKOV, Karlsruhe, Germany, MAXIM VAVILOV, Wisconsin, Madison, USA — We study non-equilibrium dc conductivity of a 2D electron gas, placed in a classically strong perpendicular magnetic field in the presence of in-plane microwave field and generic Gaussian disorder potential. Focusing the consideration on the bilinear response in the microwave field, we identify four different mechanisms essential for the linear dc resistance. We employ two specific models of the disorder relevant for ultra-high mobility samples and show that the relative strength of the above mechanisms strongly depends on the spatial range of the disorder potential. In particular, when large angle scattering dominates the transport and temperature is sufficiently high, the contribution of the "displacement" mechanism can overcome the "inelastic" contribution, which is dominant at low temperature. For smooth disorder, characterized by small angle scattering, the "displacement" contribution is strongly suppressed. Other contributions are responsible for the microwave-induced corrections to the non-diagonal part of the conductivity tensor and only weakly depend on the nature of the disorder. We discuss the ways to distinguish experimentally the contributions of the above mechanisms according to their different polarization and temperature dependence.

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