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Effect of disorder on modulated quantum Hall systems MIKITO KOSHINO, Tokyo Institute of Technology, TSUNEYA ANDO, Tokyo Institute of Technology — We present a numerical study of the quantum Hall effect in modulated two-dimensional (2D) electron systems in presence of disorder. Theoretically, it is known that a 2D periodic potential in a strong magnetic field gives rise to a recursive subband structure in Landau levels, which is called the Hofstadter butterfly[1]. Recently, the nonmonotonic behavior of the Hall conductivity peculiar to this system was observed in lateral superlattices patterned on GaAs/AlGaAs heterostructures [2,3]. To study how the Hall plateau emerges in those split Landau levels, we numerically calculate the Hall conductivity in a disordered 2D electron system with weak modulations under various magnetic fields. We investigate the scaling property of the Hall conductivity as well as the localization length, to identify the critical energies where the extended states exist. The dependence on the field amplitudes and the Landau levels is also discussed. [1] D. R. Hofstadter, Phys. Rev. B 14, 2239 (1976). [2] C. Albrecht, et al. Phys. Rev. Lett. 86, 147 (2001) [3] M. C. Geisler, et al., Phys. Rev. Lett. 92, 256801 (2004).

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