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Quantum Hall Effect near the charge neutrality point in graphene[1] JORGE A. LEON, GUENNADII M. GUSEV, Instituto de Física, Universidade de São Paulo, FLAVIO O. PLENTZ, Departamento de Física, Universidade Federal de Minas Gerais — The Quantum Hall effect (QHE) of a two-dimensional (2D) electron gas in a strong magnetic field is one of the most fascinating quantum phenomena discovered in condensed matter physics. In this work we propose to study the transport properties of the single layer and bilayer of graphene at the charge neutrality point (CNP) and compare it with random magnetic model developed in theoretical papers in which we argue that at CNP graphene layer is still inhomogeneous, very likely due to random potential of impurities. The random potential fluctuations induce smooth fluctuations in the local filling factor around $\nu = 0$. In this case the transport is determined by special class of trajectories, "the snake states", propagating along contour $\nu = 0$. The situation is very similar to the transport of a two-dimensional particles moving in a spatially modulated random magnetic field with zero mean value. We especially emphasize that our results may be equally relevant to the composite fermions description of the half-filled Landau level.

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