Conductance fluctuation in Chalker-Coddington network

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We study the longitudinal magneto-resistance of the two-dimensional electron gas (2DEG) in a perpendicular magnetic field within Chalker-Coddington theory. We calculate the conductance and its fluctuations numerically using the network model in presence of a randomly disordered potential. A scaling law is observed according to the width and length of the system when the number of channels and the degree of the disorder are sufficiently large. In cylindrical geometry, we find the conductance has maximum when the electron energy is at the saddle point of the disorder potential. Meanwhile in strip geometry, the saddle point does not ensure the conductance maximum due to edge effects. We find the conductance distribution P(g) is a symmetric Gaussian function near the saddle point (see Fig. 1) and evolves to highly asymmetric functions as the electron energy increases or decreases away from the saddle point.

keywords : 2DGE, network model, conductance, fluctuations

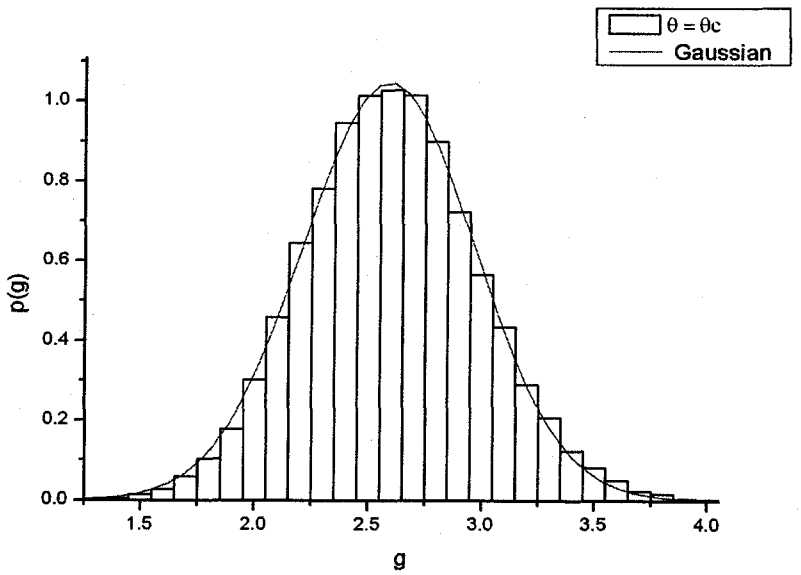

Fig. 1 Distribution of g for $\theta = \theta c$ (Saddle point).