HOPPING ENERGY AND PERCOLATION-TYPE TRANSPORT IN P-GAAS LOW DENSITIES NEAR THE 2D METAL-INSULATOR TRANSITION AT ZERO MAGNETIC FIELD

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Abstract
We study the temperature dependence of resistivity in the absence of the magnetic field near the metal-insulator transition of a high mobility of holes system in two dimensions grown on the (311) surface GaAs. The Coulomb hopping was found in a wide range of temperature and carrier density. Quantitative analysis of our results suggests that the electron-electron interaction is screened by the metal-gate increases with the localization length leading to a crossover from Efros-Shklovskii hopping to that of Mott. The hopping is slowly correlated, in agreement with recent calculations and experiments. The localization length appears to diverge power law near the transition point. The analysis of the hopping gives results consistent with the prediction of the critical point from a recent study of percolation and other experiences.

Keywords: Metal-insulator transition, Percolation, Hopping energy, Coulomb hopping

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