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Hall Conductivity in a Quasi-Two-Dimensional Disordered Electron System

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Abstract: By making use of the diagrammatic techniques in perturbation theory, we have investigated the Hall effect in a quasi-two-dimensional disordered electron system. In the weakly localized regime, the analytical expression for quantum correction to Hall conductivity has been obtained using the Kubo formalism and quasiclassical approximation. The relevant dimensional crossover behavior from three dimensions to two dimensions with decreasing the interlayer hopping energy is discussed. The quantum interference effect is shown to have a vanishing correction to the Hall coefficient.

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