Mesoscopic Quantum Hall Effect

In recent years, remarkable progress in the fabrication of novel mesoscopic devices has produced a revival of interest in quantum Hall physics. New types of measurements, more precise and efficient than ever, have made it possible to focus closely on the electronic properties of quantum Hall edge states. This is achieved by applying charge and heat currents at mesoscopic length scales, attaching metallic gates and Ohmic contacts, and splitting edge channels with the help of quantum point contacts. The experiments reveal fascinating new phenomena, such as the interference, statistics, and topological phase shifts of fractionally charged quasi-particles, strong interaction and correlation effects, and phase transitions induced by non-Gaussian fluctuations. The thesis discusses some puzzling results of these experiments and presents a coherent picture of mesoscopic effects in quantum Hall systems, which accounts for integer and fractional filling factors and ranges from microscopic theory to effective models, and covers both equilibrium and non-equilibrium phenomena. EAN/ISBN : 9783642304996 Publisher(s): Springer, Berlin Format: ePub/PDF Author(s): Levkivskyi, Ivan

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