

Critical behavior of conductivity in the quantum Hall effect regime under large-scale impurity potential

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Temperature dependences of the width of the transition regions between the quantum Hall effect phases in InGaAs/InAlAs structures with a high InAs content are analyzed according to the scaling concept [1]; the random potential scale is varied by changing the spacer width. Scaling behavior with a critical exponent, which is regularly observed in systems with a large-scale impurity potential [2, 3], with a subsequent transition to universal values of critical exponents with decreasing temperature. It is found that with an increase in the spacer width the transition occurs at a lower temperature. This observation is also confirmed by the data on the temperature dependence of the peak conductivity values obtained upon heating the electron gas by changing the value of the current. The transition to the scaling mode occurs at a higher temperature in a sample with a smaller spacer width.

[1] Pruisken A M 2010 *Int. J. Mod. Phys.* **24** 1895–1949

[2] Li W, Csathy G Aand Tsui D C, Pfeiffer L N and West K 2005 *Phys. Rev. Lett.* **94** 206807–206810

[3] Li W, Vicente C Land Xia J S, Pan W, Tsui D C, Pfeiffer L N and West K 2009 *Phys. Rev. Lett.* **102** 216801–216804