

Coherence length of edge states in the Integer Quantum Hall regime

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We have determined the finite temperature coherence length of the edge states in the Integer Quantum Hall regime at filling factor 2. This was realized by measuring the visibility of electronic Mach-Zehnder interferometers of different sizes. The visibility is shown to present an exponential decay with the temperature with a temperature scale inversely proportional to the interferometers' arm lengths. Our findings allow to define a coherence length $l_\varphi \propto T^{-1}$. The magnetic field dependence of l_φ is shown to result from a time of flight τ through the interferometer, varying with the magnetic field. Our result is in good agreement with decoherence mediated by the thermal noise of the finite frequency impedance between the two edge states of the IQHE at filling factor 2.