Mesoscopic Heat 'Multiplier' - A Quantum Hall device revealing correlated States

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Abstract

Local measurements of the heat flux in Quantum Hall devices can differ from the expected equilibrium heat flux due to interactions. We model a simple mesoscopic device, consisting of ohmic reservoirs connected via chiral edge states. In an internal edge state of the device, the interaction between the reservoirs leads to extra correlations adding to the, locally measured, equilibrium heat flux. This is also reflected in a correlation function that is modified by the interactions. The interaction effect does not discriminate between the statistics of the incoming edge states, which allows for the fusion/multiplication of FQH states. We investigate how these correlated states can be detected, discuss their thermometry and how one could reveal their nature experimentally through heat conductance measurements, interference experiments or cross correlation measurements.

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