Physical Sciences Seminar

Quantization of heat flow in the fractional quantum Hall regime

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Topological states of matter are characterized by topological invariants, which are physical quantities whose values are quantized and do not depend on details of the measured system. Among them the electrical Hall conductance, which is expressed inunits of (e^2)/h is easiest to probe. In the fractional quantum Hall effect regime, fractional quantized values of the electrical Hall conductance attest to topologically ordered states,which are states that carry quasi-particles with fractional charge and (expected) anyonic statistics. Another topological invariant, which is much harder to measure, is the thermalHall conductance, KT, expressed in units of (\kappa_0)T=[\pi^2(k_B^2/3h)]TIn 1D transport it does not depend on the particles charge, particles exchange statistics, and is even insensitive to the interaction strength among the particles. A fractional value of the quantized thermal Hall conductance shows that the probed state of matter is non-abelian. Quasiparticles in nonabelian states may be useful for topological quantum computation. In this talk, I will report our measurements of the thermal Hall conductance of the \vau=5/2 state to be fractional, implying non-abelian nature of the state.

Monday, February 25, 2019 10:00am - 11:00am
Mondi Seminar Room 2, Central Building

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