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Thermodynamic and Transport Properties of a Holographic Quantum Hall System

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We apply the AdS/CFT correspondence to study a quantum Hall system at strong coupling. Fermions at finite density in an external magnetic field are put in via gauge fields living on a stack of D5 branes in Anti-deSitter space. Under the appropriate conditions, the D5 branes blow up to form a D7 brane which is capable of forming a charge-gapped state. We add finite temperature by including a black hole which allows us to compute the low temperature entropy of the quantum Hall system. Upon including an external electric field (again as a gauge field on the probe brane), the conductivity tensor is extracted from Ohm's law.

Author: HUTCHINSON, Joel (University of Alberta)

Co-author: SEMENOFF, Gordon (UBC)

Presenter: HUTCHINSON, Joel (University of Alberta)

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