Abstract Submitted
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Particle-vortex symmetric liquid MICHAEL MULLIGAN, University of California Riverside — The magnetic field-tuned superconductor-insulator transition in disordered films is a fascinating example of a quantum phase transition. A useful framework for its description involves "dirty" Cooper-pair bosons that undergo a continuous order-disorder transition. Particle-vortex duality implies an alternative description in terms of field-induced vortices that likewise undergo a second-order transition. A recent experiment by Breznay et al. indicates that the transition is "self-dual": this implies the Cooper-pair bosons and field-induced vortices have identical dynamics at the transition. How can this be? Cooper-pair bosons carry electrical charge, while vortices are neutral. In this talk, I'll describe an effective theory that is manifestly self-dual and discuss a few of its implications, which include a prediction of approximately equal (diagonal) thermopower and Nernst signal at the transition with a deviation parameterized by the measured electrical Hall effect. In addition, I'll discuss how this theory is related to recent theoretical progress in our understanding of "bosonization" in 2+1 dimensions and new ideas for the theoretical description of the half-filled Landau level of the two-dimensional electron gas.

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