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Composite fermions and the field-tuned superconductor-insulator transition SRINIVAS RAGHU, MICHAEL MULLIGAN, Stanford University —
In several two-dimensional films that exhibit a magnetic field-tuned superconductor to insulator transition (SIT), stable metallic phases have been observed. Building on the ‘dirty boson’ description of the SIT, we suggest that the metallic region is analogous to the composite Fermi liquid observed about half-filled Landau levels of the two-dimensional electron gas. The composite fermions here are mobile vortices attached to one flux quantum of an emergent gauge field. The composite vortex liquid is a 2D non-Fermi liquid metal, which we argue is stable to weak quenched disorder. We describe several experimental consequences of the emergent composite vortex liquid.

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