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Fractional Quantum Hall Effect and Featureless Mott Insulators

ANTON BURKOV, University of Waterloo — We point out and explicitly demonstrate a close connection that exists between featureless Mott insulators and fractional quantum Hall liquids. Using magnetic Wannier states as the single-particle basis in the lowest Landau level (LLL), we demonstrate that the Hamiltonian of interacting particles (either bosons or fermions) in the LLL maps onto the Hamiltonian of a featureless Mott insulator on triangular lattice, formed by the magnetic Wannier states. The Hamiltonian is remarkably simple and consists only of short-range repulsion and ring-exchange terms.

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