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Fermi Liquid Behavior and the Ground State at Half-Filled Landau Levels E.H. REZAYI[1], MIKE GASTON, California State University Los Angeles, F.D.M. HALDANE[2], Princeton University, XIN WAN, Forschungszentrum Karlsruhe, KUN YANG[3], Florida State University — Experiments show an unquantized quantum Hall state at $\nu = 1/2$—widely believed to be a Fermi-liquid state of composite fermions. In contrast, at $\nu = 5/2$ a Hall liquid is seen, which numerical calculations have shown to be a p-wave paired state of composite fermions.In the third and higher Landau levels transport becomes anisotropic indicating the development of stripe-type order. All three states may be associated with the existence of a Fermi surface. We construct many-particle wavefunctions with periodic boundary conditions and cast them as Slater-determinants of composite fermion plane waves. We obtain the variational energies of the ground state and a number of low lying excited states near the Fermi surface by quantum Monte Carlo simulations for up to 100 electrons. From this and the K-space translational invariance of the Fermi states we extract the effective mass and the first few Fermi liquid parameters. We compare the Fermi liquid parameters, discuss the stability of the isotropic Fermi surfaces, and explore anisotropic Fermi surfaces in these Landau levels.

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