Composite Fermi surface in the half-filled Landau level with anisotropic electron mass\(^1\) MATTEO IPPOLITI, SCOTT GERAEDTS, RAVINDRA BHATT, Princeton University — We study the problem of interacting electrons in the lowest Landau level at half filling in the quantum Hall regime, when the electron dispersion is given by an anisotropic mass tensor. Based on experimental observations\(^2\) and theoretical arguments\(^3\), the ground state of the system is expected to consist of composite Fermions filling an elliptical Fermi sea, with the anisotropy of the ellipse determined by the competing effects of the isotropic Coulomb interaction and anisotropic electron mass tensor. We test this idea quantitatively by using a numerical density matrix renormalization group method for quantum Hall systems on an infinitely long cylinder\(^4\). Singularities in the structure factor allow us to map the Fermi surface of the composite Fermions\(^5\). We compute the composite Fermi surface anisotropy for several values of the electron mass anisotropy which allow us to deduce the functional dependence of the former on the latter.

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\(^5\)S. D. Geraedts et al., Science 352 (6282), 197 (2016)

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