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Four-flux fractional quantum Hall states in suspended graphene ANDREI LEVIN, BENJAMIN FELDMAN, Harvard University, BENJAMIN KRAUSS, JURGEN SMET, Max-Planck-Institut fur Festkorperforschung, AMIR YACOBY, Harvard University — The interactions between charge carriers in ultra-clean graphene subject to a perpendicular magnetic field can drive the system to condense into one of a set of incompressible fractional quantum Hall (FQH) states. We use a scanning single-electron transistor to measure the local electronic compressibility of suspended graphene. In addition to observing incompressible behavior at fractional filling factors in the two-flux composite fermion sequence, we also observe FQH states arising from four-flux composite fermions, including states at filling factors $\nu = 1/5$, $2/7$, $2/9$, $3/11$, $5/7$ and $6/5$. We measure the energy gaps of these states as a function of magnetic field; most display approximately linear scaling. Interestingly, several four-flux FQH states are conspicuously absent near filling factors $\nu = 1$ and 2, despite the robust appearance of their counterparts near $\nu = 0$.

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