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Broken-Symmetry States and Divergent Resistance in Suspended Bilayer Graphene BENJAMIN FELDMAN, JENS MARTIN, THOMAS WEITZ, MONICA ALLEN, AMIR YACOBY, Harvard University — We report the fabrication of suspended bilayer graphene devices with very little disorder. Transport measurements at zero magnetic field indicate that charge inhomogeneity in these flakes reaches as low as 10^{10} cm^{-2}. We observe quantum Hall states that are fully quantized at a magnetic field of 0.2 T, as well as broken-symmetry states at intermediate filling factors $\nu = 0$, ± 1, ± 2 and ± 3. In the $\nu = 0$ state, the resistance of the flakes increases exponentially with applied magnetic field and scales as magnetic field divided by temperature. This resistance is predominantly affected by the perpendicular component of the applied field and the extracted gap size is larger than expected from Zeeman splitting, indicating that the broken-symmetry states arise from many-body interactions and underscoring the importance of Coulomb interactions in bilayer graphene.

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