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Magneto-transport of graphene quantum dots KUEI-LIN CHIU, CHARLES SMITH, MALCOLM CONNOLLY, SIMON CHORLEY, JONATHAN GRIFFITHS, University of Cambridge — Graphene nanostructures continue to attract attention due to their customizable electronic properties and compatability with existing semiconductor device processing. The promise of long spin relaxation times makes graphene quantum dots small islands of confined charge - particularly suited to quantum computing architectures that manipulate the spin degree of freedom. In order to probe the spin and charge dynamics of geometrically confined Dirac quasiparticles, we have performed magneto-transport measurements on a single dot and a series-coupled double dot at temperatures down to 100 mK and magnetic fields up to 12 T. In the single dot structure we follow the energy required to add electrons to the dot in the many-electron regime. The energy levels show a rich structure of "kinks" as a function of the magnetic field, and we analyze this result in terms of Landau level formation in the quantum dot. In the double quantum dot structure we find that the conductance of the device as a function of the energy levels in the dots exhibits the typical honeycomb pattern. From the dimensions of the honeycomb we extract the capacitive coupling strength between dots and the gates, and examine how this evolves as a function of magnetic field. We analyze this result in terms of magnetic field induced changes in the capacitive coupling between the quantum dot and the plunger-gates.

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