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Kondo quantum criticality in graphene[1] JINHAI MAO, IVAN SKACHKO, GUOHONG LI, EVA ANDREI, Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08855, USA, DEPARTMENT OF PHYSICS AND ASTRONOMY, RUTGERS UNIVERSITY, PISCATAWAY, NEW JERSEY 08855, USA TEAM — The Kondo effect, observed in the presence of coupling between a local magnetic moment and spin degenerate conduction electrons, is a hallmark of the electronic transport in conventional metallic systems. Screening of the local moment gives rise at low temperatures to characteristic signatures in the density of states and electronic spectral function such as the Kondo resonance. Graphene a strictly two dimensional system with carriers whose electronic properties mimic massless Dirac fermions provides a new paradigm for studying interactions in a system where the density of states is linear and can be made vanishingly small by gating, rather than being constant as is the case in standard metallic systems. We study the effect of interactions between the ultra-relativistic electrons in graphene and local magnetic moments introduced by point vacancies in the honeycomb lattice of graphene. Using scanning tunneling spectroscopy and transport measurements we measure the Kondo quantum critical transition and its dependence on carrier density.

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