

Abstract Submitted  
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**Many-Body Interactions in Quasi-Freestanding Graphene** DAVID

SIEGEL, University of California, Berkeley / Lawrence Berkeley National Lab, CHEOL-HWAN PARK, University of California, Berkeley, CHOONGYU HWANG, Lawrence Berkeley National Laboratory, JACK DESLIPPE, University of California, Berkeley / Lawrence Berkeley National Lab, ALEXEI FEDOROV, Advanced Light Source, Lawrence Berkeley National Laboratory, STEVEN LOUIE, ALESSANDRA LANZARA, University of California, Berkeley / Lawrence Berkeley National Lab — The Landau-Fermi liquid picture for quasiparticles assumes that charge carriers are dressed by many-body interactions, forming the basis of any theory of solids. Whether this picture still holds for a semimetal like graphene at the neutrality point, i.e. when the chemical potential coincides with the Dirac point energy, is one of the long-standing puzzles in this field. Here we present the first direct measurements of the self-energy in graphene near the neutrality point, by using high-resolution angle-resolved photoemission spectroscopy. These exciting findings set a new benchmark in our understanding of many-body physics in graphene and a variety of novel materials with Dirac fermions.

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