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Zero-bias conductance anomaly in point-contact junctions on graphite[1] WAN KYU PARK, CESAR CHIALVO, RICH JONES, SAM JOHNSON, NADYA MASON, LAURA GREENE, University of Illinois at Urbana-Champaign — The electronic properties of graphene, a two-dimensional carbon allotrope, continue to attract great interest because of the interesting underlying physics and application potential of this novel electronic material. An ideal single-layer graphene is known to show a linear behavior in the electronic density of states (DOS) around the Fermi level. The ability to engineer the DOS of single- and multi-layer graphene is considered as a fundamental requirement for the realization of electronic devices. To investigate the electronic DOS in graphene/graphite, we adopt a spectroscopic technique based on nanoscale point-contact junctions, where differential conductance spectra are taken at around the liquid helium temperature. A common feature observed in all junctions on both Kish graphite and HOPG is an anomalous conductance dip at zero bias. The conductance curves show a logarithmic bias dependence in their slopes, exhibiting a systematic evolution as a function of magnetic field and contact pressure. We discuss possible origins of these behaviors including the possibility of modification in the electronic DOS of graphite.

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Wan Kyu Park
University of Illinois at Urbana-Champaign

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