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Scattering of Electrons from Impurities in Graphene J.Y. VAISHNAV, Bucknell University, CHARLES W. CLARK, Joint Quantum Institute, National Institute of Standards and Technology, J.D. WALLS, University of Miami —
We develop a theoretical formalism to describe scattering of electrons in graphene from impurities. Our formalism applies to low-energy incident particles scattering from impurities much larger than the lattice constant. At long wavelengths, our formalism allows determination of all transport properties of the system via inversion of a $6N$ x $6N$ matrix, where N is the number of impurities. We discuss how single and multiple scattering from impurities in graphene differ from scattering on ordinary metallic substrates. For example, due to the Dirac-like dispersion relation of graphene, even low-energy scattering from an impurity generates a combination of s and p waves. Our results are equally applicable to an atom scattering from other atoms confined in a honeycomb optical lattice. In this situation, the locations of impurities could be controlled, suggesting possible "atomtronic" device applications.

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