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Drift of Dirac points in defected graphene MARC DVORAK, ZHIGANG WU, Department of Physics, Colorado School of Mines — Graphene's remarkable electronic properties are due to isotropic hopping between nearest-neighbor carbon atoms on a honeycomb lattice. If anisotropic hopping is introduced, Dirac points move in reciprocal space away from **K** and **K**'. In this work, we investigate the effect of periodic defects on the electronic structure of graphene using both analytic theory and numerical *ab initio* computations. Our tight-binding model suggests that if the defect has a preferred direction, or anisotropy, the Dirac points move in reciprocal space. Analytic predictions for the magnitude and direction of drift are in excellent agreement with *ab initio* calculations. In addition, we show that a semimetal-to-insulator transition occurs when the Dirac points drift onto certain high symmetry points of the supercell Brillouin zone.

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