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Dirac Spectrum in One-Dimensional Potentials. L. BREY, ICMM-CSIC (Spain), D.P. AROVAS, University of California, San Diego, H.A. FERTIG, Indiana University, EUN-AH KIM, Stanford University, K. ZIEGLER, Univ Augsburg — We investigate the effect of one-dimensional potentials on the electronic properties of graphene using the continuum Dirac equation appropriate at low energies. In the case of a periodic potential of the form $V(x) = V_0 \cos(G_0 x)$, new zero energy Dirac points emerge whenever the condition $J_0(\frac{2V_0}{\hbar v_F G_0})$ is satisfied. In the case of piecewise constant potentials new Dirac points are present throughout the band structure, and in the special case of a particle-hole symmetric potential they occur, as in the cosine potential case, at zero energy. The analysis of the conductance parallel to the periodic potential demonstrates that resonances accompany the emergence of the induced Dirac points. We also consider the cases of a single trench and a p-n junction embedded in neutral graphene. In both cases, we obtain that these structures support confined states that lead to interference effects in the conductance across these structures.

L. Brey
ICMM-CSIC (Spain)

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