

Abstract Submitted  
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**Trigonal Band Structure and Time-Reversal Invariance in Graphene** ROLAND WINKLER, Northern Illinois University, ULRICH ZUELICKE, Massey University — We present a symmetry analysis of the trigonal band structure in graphene. While the energy spectrum near the Fermi edge equals the spectrum of massless Dirac fermions, the transformational properties of the underlying basis functions are qualitatively different. Using group theory we develop an invariant expansion of the Hamiltonian for the electron states near the  $\mathbf{K}$  points of the graphene Brillouin zone. We find that the  $k$ -linear dispersion near the band edge arises as an unusual consequence of time-reversal invariance. We suggest to divide the electronic properties of graphene into two categories, those that depend and those that do not depend on the transformational properties of the Bloch functions at  $\mathbf{K}$ . See arXiv:0807.4204.

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