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Implications of time-reversal symmetry for band structure of single-wall carbon nanotubes SERGUEI GOUPALOV[1], Jackson State University — When electron states in carbon nanotubes are characterized by two-dimensional wave vectors with the components K_1 and K_2 along the nanotube circumference and cylindrical axis, respectively, then two such vectors symmetric about a **M**-point in the reciprocal space of graphene are shown to be related by the time-reversal operation. To each nanotube there correspond five relevant **M**-points with the following coördinates: $K_1^{(1)} = \mathcal{N}/2R$, $K_2^{(1)} = 0$; $K_1^{(2)} = \mathcal{M}/2R$, $K_2^{(2)} = -\pi/T$; $K_1^{(3)} = (2\mathcal{N} - \mathcal{M})/2R$, $K_2^{(3)} = \pi/T$; $K_1^{(4)} = (\mathcal{M} + \mathcal{N})/2R$, $K_2^{(4)} = -\pi/T$, and $K_1^{(5)} = (\mathcal{N} - \mathcal{M})/2R$, $K_2^{(5)} = \pi/T$, where $\mathcal{N}$ and $\mathcal{M}$ are the integers relating the chiral, $\mathbf{C}_h$, symmetry, **R**, and translational, **T**, vectors of the nanotube by $\mathcal{N}\,\mathbf{R} = \mathbf{C}_h + \mathcal{M}\,\mathbf{T}$, $T = |\mathbf{T}|$, and R is the nanotube radius. We show that the states at the edges of the one-dimensional Brillouin zone which are symmetric about the **M**-points with $K_2 = \pm\pi/T$ are degenerate due to the time-reversal symmetry. Explicit expressions are obtained for the coördinates of the **K**-points in the reciprocal space of graphene relevant to a given nanotube.

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