

Graphene with a spin-orbit super-lattice potential

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We study the band-structure of graphene in the Dirac approximation in the presence of periodically modulated spin-orbit interactions. We show that, when the lattice momentum is along the modulation direction, the band-structure is given by two separate equations related to the different spin states under the potential. These equations can be derived by considering the case where either the two modes corresponding to one spin state or the two modes corresponding to the other spin state are available under the potential.

This is in sharp contrast to the case where there is a finite angle between the lattice momentum and the modulation direction. Here, the band-equations cannot be separated and we evaluate the band-structure numerically.