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Bound states of single-layer and bilayer graphenes with one-dimensional potential AKIHIRO OKAMOTO, TAKEHITO YOKOYAMA, Tokyo Institute of Technology, SHUICHI MURAKAMI, TIES,Tokyo Institute of Technology — Both the graphene and a surface of a topological insulator have Dirac cones. For a Dirac cone on a surface of a topological insulator, a one-dimensional potential well leads to bound states with linear dispersions [1]. A similar behavior is expected for graphene. We study behaviors of bound states in single-layer and bilayer graphenes with a one-dimensional potential well. In bilayer graphene within the continuum model, two types of bound states coexist. One exists only within a finite range of the wavenumber, while the other exists for any wavenumber. We also compare the results for the continuum model with that of the lattice model in the single-layer and bilayer graphenes. We present how these bound states change as the potential energy is changed.
[1] T. Yokoyama, A.V.Balatsky, and N. Nagaosa, Phys. Rev. Lett. 104, 246806 (2010).

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