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Bound states in single and bilayer graphenes by a one-dimensional potential well: continuum model versus lattice model AKIHIRO OKAMOTO, TAKEHITO YOKOYAMA, Department of Physics, Tokyo Institute of Technology, SHUICHI MURAKAMI, TIES, Tokyo Institute of Technology — Edges of a graphene show characteristic edge states depending on its edge shapes such as zigzag or armchair. Instead of these edge states, we consider bound states on a graphene with a one-dimensional potential well. We set the potential well which has a finite width in one direction and is infinitely extended in the other direction. We consider both the single layer and bilayer graphenes. In the continuum model of Dirac cones, we can analytically calculate the bound states, and discuss their properties. Then we also calculate analytically the bound states, also for the tight-binding model for single-layer graphene. It reproduces the results for the continuum model, such as a linear dispersion of bound states near K and K$'$ points. We discuss how the bound states dispersion change for various potential profiles.

Akihiro Okamoto
Department of Physics, Tokyo Institute of Technology

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