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Landau quantization in monolayer GaAs[1] HSIEN-CHING CHUNG[2], National Kaohsiung Normal University, CHING-HONG HO, CHENG-PENG CHANG, Tainan University of Technology, CHUN-NAN CHEN, Tamkang University, CHIH-WEI CHIU, National Kaohsiung Normal University, MING-FA LIN, National Cheng Kung University — In the past decade, the discovery of graphene has opened the possibility of two-dimensional materials both in fundamental researches and technological applications. However, the gapless feature shrinks the applications of pristine graphene. Recently, researchers have new challenges and opportunities for post-graphene two-dimensional nanomaterials, such as silicene (Si), germanene (Ge), and tinene (Sn), due to the large enough energy gap (of the size comparable to the thermal energy at room temperature). Apart from the graphene analogs of group IV elements, the buckled honeycomb lattices of the binary compositions of group III-V elements have been proposed as a new class of post-graphene two-dimensional nanomaterials. In this study, the generalized tight-binding model considering the spin-orbital coupling is used to investigate the essential properties of monolayer GaAs. The Landau quantization, band structure, wave function, and density of states are discussed in detail.

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