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Geometric and Electronic structures of deformed bilayer graphenes JEN-HSIEN WONG, Department of Physics, National Cheng Kung University, Tainan, Taiwan, BI-RU WU, Department of nature science, Center for General Education, Chang Gung University, Taoyuan, Taiwan, MING-FA LIN, Department of Physics, National Cheng Kung University, Tainan, Taiwan — The electronic properties of bilayer AB-stacked graphene are investigated with a first-principles method when homogeneous and uniaxial strains are exerted. The two types of strains can be either tensile or compressive. The maximum deformation ratio is 36% for tensile strain, and 20% for compressive strain. The uniaxial strains along the armchair (A strain) or zigzag (Z strain) directions are considered. Bilayer AB-stacked graphene belongs to semimetal essentially. One pair of π bands owns two intersections near the Fermi level. One intersection lies at K point; the other one is near K point along the path of Γ to K. The π band overlap is approximately 2.6meV. No gap will be developed for bilayer graphene under homogenous strain or A strain. Nevertheless, tensile Z strain results in a tiny indirect band gap near R point.

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