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Electronic band gaps and transport properties in periodically alternating mono- and bi-layer graphene superlattices XIONG FAN, WENJUN HUANG, TIANXING MA, Beijing Normal University, LI-GANG WANG, Zhejiang University, HAI-QING LIN, Beijing Computational Science Research Center — We investigated electronic band structure and transport properties of periodically alternating mono- and bi-layer graphene superlattices (MBLG SLs). In such MBLG SLs, there exists the zero-averaged wave vector (zero-$\overline{k}$) gap, which is insensitive to the lattice constant, and this zero-$\overline{k}$ gap can be controlled via changing both the ratio of potentials' widths and the interlayer coupling coefficient of bilayer graphene. It is also found that there exist the extra Dirac points and their conditions are analytically presented. Lastly, it shows that the electronic transport properties and the energy gap (E_g) of the first two bands in MBLG SLs are tunable by the interlayer coupling and the widths' ratio of the periodic mono- and bi-layer graphene.

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