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Spin-orbit coupling in bi-layer and tri-layer graphene in transverse electric field: first-principles calculations¹ MARTIN GMITRA, SERGEJ KONSCHUH, JAROSLAV FABIAN, University of Regensburg, Germany — Few-layer graphene structures may be potentially useful for optical and transport applications, due to the possibility of electrical control of the band gaps. Here we investigate the spin-orbit coupling of bilayer and tri-layer graphene around the Fermi level. We show, by performing first-principles full potential linearized augmented plane waves calculations that the spin-orbit physics in these structures derives essentially from monolayer graphene. In particular, the spin splitting of the bands is due to the spin-orbit coupling of the d-orbitals. These give a splitting of the order of $24\ \mu\text{eV}$ at the K point, as in graphene. Breaking the spatial inversion symmetry by a transverse electric field does not change this (intrinsic) picture, unlike what we know from graphene.

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