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Gate-induced Gap in Bilayer Graphene Suppressed by Coulomb Repulsion YU-ZHONG ZHANG, JIN-RONG XU, ZE-YI SONG, Tongji Univ, HAI-QING LIN, Beijing Computational Science Research Center — We investigate the effect of on-site Coulomb repulsion U on the band gap of the electrically gated bilayer graphene by employing coherent potential approximation in the paramagnetic state, based on an ionic two-layer Hubbard model. We find that, while either the on-site Coulomb repulsion U or the external perpendicular electric field E alone will favor a gapped state in the bilayer graphene, competition between them will surprisingly lead to a suppression of the gap amplitude. Our results can be applied to understand the discrepancies of gap size reported from optical and transport measurements, as well as the puzzling features observed in angular resolved photoemission spectroscopic study.

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