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Engineering Graphene Pseudospin Structure with Van der Waals Coupling CHENHAO JIN, ZHIWEN SHI, University of California, Berkeley, WEI YANG, Institute of Physics, Chinese Academy of Sciences, LONG JU, JASON HORNG, University of California, Berkeley, GUANGYU ZHANG, Institute of Physics, Chinese Academy of Sciences, FENG WANG, University of California, Berkeley & Lawrence Berkeley National Laboratory — Electrons in graphene are described by relativistic Dirac-Weyl spinors with two-component pseudospin. The unique pseudospin structure leads to emerging phenomena such as the massless Dirac cone, anomalous quantum Hall effect, and Klein tunneling. The capability to manipulate electron pseudospin is highly desirable for novel graphene electronics, and is recently achieved by van der Waals coupling to substrate such as graphene/BN and twisted bilayer graphene. We calculate the van der Waals coupled graphene/substrate system and show that the pseudospin structure can be modified in several ways, which will lead to distinctive experimental results.

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