

Abstract Submitted
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Tuning of spin-orbit coupling in heterostructures formed by transition metal dichalcogenides and graphene¹ SATRIO GANI, ERIC WALTER, ENRICO ROSSI, William Mary Coll — Graphene and bilayer graphene have extremely high mobilities but negligible spin orbit coupling (SOC). The ability to induce significant SOC in graphene without reducing its mobility would make it an ideal system to study transport properties that rely on the presence of SOC. Recent experimental results suggest that this could be achieved in van der Waals heterostructures in which graphene is in close proximity to materials with significant SOC. Using ab initio methods we systematically study the electronic structure of heterostructures formed by monolayers of transition metal dichalcogenides (TMDs) and graphene, or bilayer graphene. We consider heterostructures with different number of layers, different TMDs, and different stacking configurations to identify the optimal configurations that enhance the spin-orbit coupling in the graphenic layer and the key parameters of the structures that control its strength.

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Satrio Gani
William
Mary Coll

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