

Seminar announcement

Tuesday, December 10, 2024 1:30 pm WSI, Seminar room S 101 Exclusively in person

"Proximity-induced spin interactions in twisted van der Waals heterostructures"

Proximity-induced phenomena in van der Waals heterostructures have emerged as a platform to tailor the electronic, spin, optical, magnetic, and topological properties in 2D materials. A crucial degree of freedom, which has only recently been recognized, is the relative twist angle between the monolayers. I will present comprehensive DFT-based results on twist- and gate-tunable proximity spin-orbit and exchange coupling in various 2D material heterostructures. Remarkably, in graphene/Cr2Ge2Te6, the proximity exchange splitting of Dirac states can be reversed upon twisting. In WSe2/Crl3, the valley splitting shows a gigantic tunability combining twisting and gating. In graphene/TMDC bilayers, the spin-orbit splittings and fields of proximitized Dirac states can be tailored by twisting. I will also relate these findings to experimentally verifiable fingerprints of proximity-induced spin interactions. While the above topics are presented in detail, I will also give an outlook on future research directions, including radial Rashba spin-orbit torque in all-2D vdW heterostructures.

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