

Scattering of topological kink-antikink states in bilayer graphene

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Gapped bilayer graphene can support the presence of intragap states due to kink gate potentials applied to the graphene layers. Electrons in these states display valley-momentum locking, which makes them attractive for topological valleytronics. Here, we show that kink-antikink local potentials enable modulated scattering of topological currents. We find that the kink-antikink coupling leads to anomalous steps in the junction conductance. Further, when the constriction detaches from the propagating modes, forming a loop, the conductance reveals the system energy spectrum. Remarkably, these kink-antikink devices can also work as valley filters with tiny magnetic fields.

- [1] N. Benchtaber, D. Sanchez, L. Serra, Scattering of topological kink-antikink states in bilayer graphene, arXiv:2103.13323