
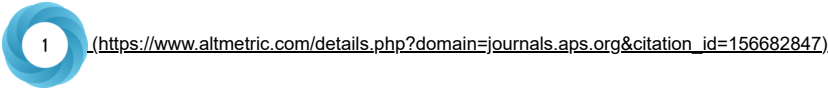


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Design of spin-orbital texture in ferromagnetic/topological insulator interfaces

A. L. Araújo, F. Crasto de Lima, C. H. Lewenkopf, and A. Fazzio  
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ABSTRACT

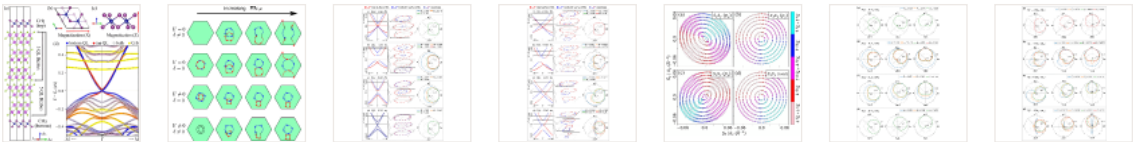
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ABSTRACT

Spin-orbital texture in topological insulators due to the spin locking with the electron momentum play an important role in spintronic phenomena that arise from the interplay between charge and spin degrees of freedom. We have explored interfaces between a ferromagnetic system ( $\text{CrI}_3$ ) and a topological insulator ( $\text{Bi}_2\text{Se}_3$ ) that allow the manipulation of spin-orbital texture. Within an *ab initio* approach we have extracted the spin-orbital-texture dependence of experimentally achievable interface designs. The presence of the ferromagnetic system introduces anisotropic transport of the electronic spin and charge. From a parametrized Hamiltonian model we capture the anisotropic backscattering behavior, showing its extension to other ferromagnetic/topological insulator interfaces. We verified that the van der Waals TI/MI interface is an excellent platform for controlling the spin degree of freedom arising from topological states, providing a rich family of unconventional spin-texture configurations.



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