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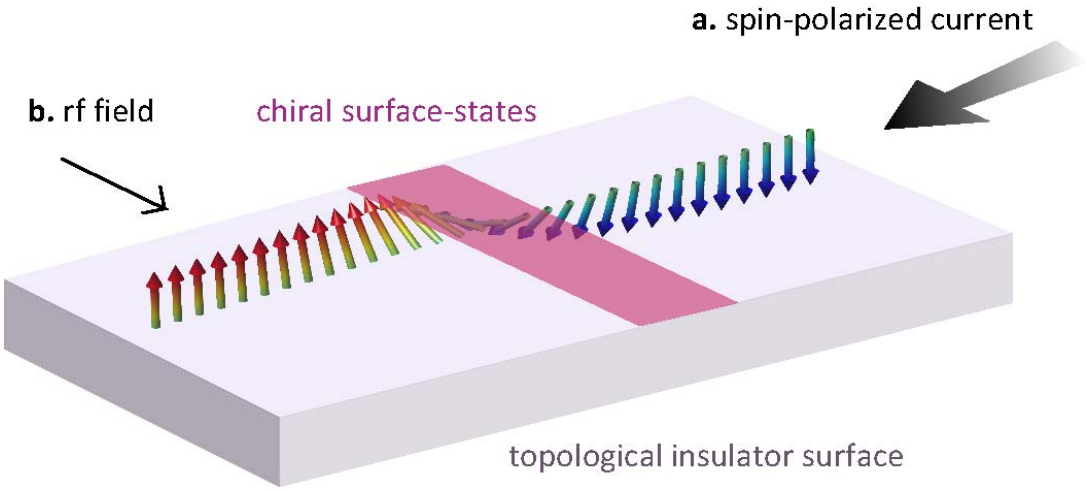
Improved domain-wall dynamics and magnonic torques using topological insulators

We have determined the magnetization dynamics that arises when a thin-film ferromagnet is deposited on a topological insulator (TI). Focusing on domain wall motion and the possibility of spin-wave torques, we show analytically that a number of interesting physical effects arise. The coupling between the domain wall and the TI stabilizes one particular chirality and topological charge of the magnetic texture. Moreover, the Walker breakdown threshold is substantially increased, allowing for higher attainable wall velocities. Finally, we show that spin-wave excitations in this system act with a torque even on homogeneous magnetization textures.



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