

# Chiral Hall effect in the kink states in topological insulators with magnetic domain walls

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We investigate the chiral Hall effect due to topologically protected chiral kink states formed in 2D topological insulators at boundaries between domains with differing topological invariants [1]. Such systems include the surfaces of three dimensional topological insulators magnetically doped or in proximity with ferromagnets. We analyze the equilibrium charge current along the domain wall and show that it is equal to the sum of counter-propagating equilibrium currents flowing along external boundaries of the domains. In addition, we also calculate a dissipative current along the domain wall when an external voltage is applied perpendicularly to the wall. This effect is different from the anomalous Hall effect and we therefore named it the “chiral Hall effect”.

## References:

[1] M. Sedlmayr, N. Sedlmayr, J. Barnaś, and V.K. Dugaev, Physical Review B, 101, 155420 (2020)