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Nonreciprocal dynamics of domain wall in ferromagnetic film[1]
SHU ZHANG, OLEG TCHERNYSHYOV, Department of Physics, IQM, Johns Hopkins University — We model the dynamics of a domain wall in a thin ferromagnetic film with the easy axis perpendicular to the film plane. A domain wall is modeled as a string whose Lagrangian, in addition to the standard string tension and kinetic energy, possesses a Berry phase term reflecting the precessional dynamics of spins. Waves propagating left and right have different speeds on such a string. We solve the equations of motion for a domain wall driven by an external magnetic field. A sudden application of an in-plane field results in the appearance of kinks (slope discontinuities) on the domain wall, which propagate back and forth along the wall.

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Shu Zhang
Department of Physics, IQM, Johns Hopkins University

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