

Abstract Submitted
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Nonreciprocal dynamics of domain wall in a finite ferromagnetic thin film¹ SHU ZHANG, OLEG TCHERNYSHYOV, Johns Hopkins University — We give a minimum model for the dynamics of a domain wall in a ferromagnetic thin film with the easy axis perpendicular to the film plane. The 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. We solve analytically the equations of motion of such a string on which waves propagating left and right have different speeds. The string with free boundary conditions translates uniformly with a speed set by the initial configuration. The dynamics driven by an in-plane and an out-of-plane magnetic field is also derived. A sudden application of an in-plane field on a flat string results in the appearance of kinks (slope discontinuities) on the string, which propagate back and forth along it.

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