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Mechanics of magnetic solitons[1]

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Magnets host a variety of solitons that are stable for topological reasons: domain walls, vortices, and skyrmions, to name a few. Because of their stability, topological solitons can potentially be used for storing and processing information. This motivates us to build economic, yet realistic models of soliton dynamics in magnets. E.g., a domain wall in a cylindrical ferromagnetic wire can be pictured as a bead on a string, which can move along the string and rotate about its axis. Its mechanics is counterintuitive: it rotates when pushed and moves when twisted. Attempts to define the linear momentum of a topological soliton often yield paradoxical results. I will review basic models of ferro- and antiferromagnetic domain walls in one dimension and give examples from higher dimensions.

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