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How to move topological solitons in antiferromagnets[1] SAYAK DASGUPTA, OLEG TCHERNYSHYOV, Johns Hopkins University — We study the dynamics of topological solitons in antiferromagnets using a Lagrangian formalism constructed in terms of collective coordinates representing the soft modes of the defect. We adopt a procedure by which we can effectively study the interplay of internal exchange fields and external fields (magnetic and spin current) which allows us to determine whether solitons can be moved and under what conditions. In our investigation we consider the examples of one dimensional domain walls and planar vortices focusing on their dynamics. It turns out that to effectively move the soliton either a finite ferromagnetic moment has to be induced through an asymmetric exchange, or there must be internal forces exerting a static friction on the defect. We also outline a procedure, using a crossed magnetic (out of plane) and spin current field, by which one can move antiferromagnet vortices in planar geometries without the requirement of an asymmetric exchange.

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