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Title: Dynamics of vortices and skyrmions in antiferromagnets

Abstract: Starting from a discrete spin model (Heisenberg model) we derive a sigma-model as the continuum approximation for the micromagnetic order parameter in an antiferromagnet. This is Lorentz invariant showing that the dynamics of solitons is radically different than that in ferromagnets. When an homogeneous external field is applied the continuum model is found to be an extension of the nonlinear sigma-model. A link between topology and dynamics is established. Vortex dynamics is affected rather profoundly and acquires the characteristic features of the Hall effect of electrodynamics or the Magnus effect of fluid dynamics. In particular, a single vortex is always spontaneously pinned, two like vortices form a rotating bound state, and a vortex–antivortex pair undergoes Kelvin motion. This is joint work with Nikos Papanicolaou.