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Fast magnetization switching of Stoner particles: A nonlinear dynamics picture[1] XIANG RONG WANG, ZHOUZHOU SUN, The Hong Kong University of Science and Technology — We reexamine the problem of the magnetization switching of Stoner particles in the presence of dissipation from the point of view of nonlinear dynamics. Within the Landau-Lifshiz-Gilbert formulation, we illustrate how the fixed points and their basins change under a perpendicular and a parallel field. This change explains well why a non-parallel field gives a small minimal switching field and a short switching time. Furthermore, we clarify that the so-called Stoner-Wohlfarth (SW) limit is exact only when the dissipation is infinitely large. However, for a give magnetic anisotropic energy function, there is a critical dissipation above which the minimal switching field is the same as that of SW-limit. The reason and meaning of such a critical disspistion is also given.

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Xiang Rong Wang
The Hong Kong University of Science and Technology

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