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Magnetic Reversal Time in Open Long Range Systems FAUSTO BORGONOVI, Dipartimento di Matematica e Fisica, Università Cattolica, via Musei 41, 25121, Brescia, Italy, LUCA CELARDO, Department of Physics , Tulane University, New Orleans, LA 70118, BRUNO GONCALVES, Emory University, Atlanta, Ga 30322, LUCA SPADAFORA, Dipartimento di Matematica e Fisica, Università Cattolica, via Musei 41, 25121, Brescia, Italy — Topological phase space disconnection has been recently found to be a general phenomenon in isolated anisotropic spin systems. It sets a general framework to understand the emergence of ferromagnetism in finite magnetic systems starting from microscopic models without phenomenological on-site barriers. Here we study its relevance for finite systems with long range interacting potential in contact with a thermal bath. We show that, even in this case, the induced magnetic reversal time is exponentially large in the number of spins, thus determining *stable* (to any experimental observation time) ferromagnetic behavior. Moreover, the explicit temperature dependence of the magnetic reversal time obtained from the microcanonical results, is found to be in good agreement with numerical simulations. Also, a simple and suggestive expression, indicating the Topological Energy Threshold at which the disconnection occurs, as a real energy barrier for many body systems, is obtained analytically for low temperature.

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