Abstract Submitted
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Incoherent stress-mediated magnetization reversal in shape anisotropic multiferroic nanomagnets[1] DHRITIMAN BHATTACHARYA, MD MAMUN AL-RASHID, VIMAL SAMPATH, NOEL D'SOUZA, SUPRIYO BANDYOPADHYAY, JAYASIMHA ATULASIMHA, Virginia Commonwealth Univ — Strain mediated switching of multiferroic nanomagnets promises to be extremely energy efficient with dissipation per switching event of ˜1 aJ[1,2,3]. Most theoretical approaches to studying the switching dynamics use the macrospin approximation in which all the spins in the nanomagnet are assumed to rotate coherently. However, recent experiments show that while initial and final states are well approximated by this single domain assumption, intermediate states visited during the magnetization rotation process cannot be described by it. In such cases, an interplay between the exchange, magnetostatic and stress anisotropy energies can introduce incoherent magnetization dynamics. Hence, intermediate micromagnetic configurations such as vortex states can be stabilized, particularly in nanomagnets of larger dimensions. In this work, we present rigorous micromagnetic simulations to study the peculiarities of the incoherent switching process in the context of shape anisotropic nanomagnets subjected to stress. 1.Appl. Phys. Lett., 97, 173105, 2010. 2.Appl. Phys. Lett., 99, 063108, 2011. 3.Nanotechnology, 23, 105201, 2012.

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