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Effects of disorder on vortex gyration HONGKI MIN, CNST, NIST, Gaithersburg, MD 20899 and NanoCenter, UMD, College Park, MD 20742, R.D. MCMICHAEL, CNST NIST, Gaithersburg, MD 20899, J. MILTAT, Laboratoire de Physique des Solides Universite Paris XI Orsay, France, M.J. DONAHUE, MCSD, NIST, Gaithersburg, MD 20899, M.D. STILES, CNST, NIST, Gaithersburg, MD 20899 — The dynamics of magnetic domain wall structures driven by fields or currents is a subject of practical importance related to possible schemes for nanoscale magnetic memory devices. Experimental results are typically interpreted in comparison to ideal models that ignore the effects of extrinsic disorder and internal dynamics of domain wall structures. To understand the effect of disorder on the dynamics of vortex domain walls, we study the dynamics of vortex gyration driven by an external magnetic field pulse in the presence of extrinsic random potential. We analyze micromagnetic simulations using ideal models and observe that effective damping increases as the gyration frequency increases. We discuss the origin of the enhanced effective damping.

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