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Torque magnetometry of permalloy-coated microcantilevers using higher order vibrational modes JOSEPH LOSBY, JACOB A.J. BURGESS, Department of Physics, University of Alberta and National Institute for Nanotechnology, DOUGLAS VICK, National Institute for Nanotechnology, JOHN P. DAVIS, Department of Physics, University of Alberta, WAYNE K. HIEBERT, National Institute for Nanotechnology, MARK R. FREEMAN, Department of Physics, University of Alberta — There has been an accumulation of recent interest in the development of magnetometry techniques facilitating the use of nano- and micro-resonators. A finite element model describing the interaction of a magnetic cantilever driven at its fundamental resonance frequency by an external field is described and illustrated for the simple case of a straight domain wall propagating across the cantilever during magnetization reversal. The experimental results are compared to the finite element mechanical transformation of Landau-Lifshits-Gilbert based micromagnetic simulations. This idea is then extended to higher order (flexural and torsional) modes, with the intent of moving towards increased sensitivity and functionalization of magnetometers for the observation of quasi-static magnetization processes.

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