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Modification of edge mode dynamics by oxidation in $Ni_{80}Fe_{20}$ thin film edges[1] MENG ZHU, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD USA and Maryland NanoCenter, University of Maryland, College Park, MD USA, ROBERT MCMICHAEL, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD USA — As magnetic storage and logic devices scale down to the sub-micron level, the effect of edge oxidation on magnetic properties needs to be identified. We use "edge mode" ferromagnetic resonance (FMR) to probe the magnetic properties of oxidized $Ni_{80}Fe_{20}$ (Py) nanostripe edges. The oxidation is carried out using either oxygen plasma or thermal annealing in oxygen. For both treatments, the edge saturation field decreases with oxidation. However, the effects of the two oxidation methods on the effective out-of-plane anisotropy field show opposite trends. Bulk mode resonance shifts and micromagnetic simulations suggest that a reduction in the bulk magnetization occurs during thermal annealing. Linewidth measurements show that plasma oxidation produces little change in damping, but thermal annealing increases effective damping.

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