Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Damping Dependence in Microwave Assisted Magnetization Reversal YUNPENG CHEN, XIN FAN, QI LU, JOHN XIAO, University of Delaware — Microwave assisted magnetization reversal (MAMR) is one possible technique to mitigate the writability problem in ultrahigh density magnetic recording. In the presence of microwaves, the magnetization reversal of a magnetic recording material could be triggered at significantly reduced switching field. The damping constant is one of the critical parameters in magnetization switching for the magnetization precession spiraling down to the direction along the external field. We demonstrate microwave assisted magnetization reversal (MAMR) in a CoFeB film and the damping dependence in MAMR through the measurement of ferromagnetic resonance (FMR). Spin-pumping in non-ferromagnetic/ferromagnetic films provides a large range variation of Gilbert damping constants in magnetic samples when changing the thickness of non-ferromagnetic layers without changing the ferromagnetic film. An evident dependence of switching fields on the damping constant is observed in the presence of microwaves. The trend of the experiment data is well reproduced by a numerical simulation based on the Landau-Lifshitz-Gilbert equation. The result indicates that the large damping decreases the efficiency of microwaves in reducing the magnetization switching field.

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Date submitted: 22 Nov 2011 Electronic form version 1.4