

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Laser induced ultrafast magnetization dynamics in CoPt multilayer** A. BARMAN, S. WANG, H. SCHMIDT, School of Engineering, University of California Santa Cruz, 1156 High Street, Santa Cruz, CA 95064, A. BERGER, Hitachi Global Storage Technologies, San Jose Research Center, 650 Harry Rd., San Jose, CA 95120 — We study femtosecond laser induced magnetization dynamics in CoPt multilayer structures in the presence of an externally applied magnetic field. The dynamics revealed three different time regimes. The first few hundred femtoseconds show an instantaneous demagnetization, followed by a quick recovery within next few picoseconds. Subsequently, an oscillatory motion comes into play whose frequency is field dependent and attributed to the precessional motion of magnetization. The sudden heating with laser pulses causes a rapid change in the anisotropy of the sample that results in a change in the equilibrium orientation of magnetization and triggers a precession. The precessional dynamics completely decays within 100ps leaving it to a slower recovery of magnetization. Analysis of the time-resolved magnetization shows a single precessional mode at higher fields, while several modes become apparent at lower fields. The dependence of different frequency modes and their damping on the applied field are studied to understand the dynamics in more detail. The effects of the anisotropy field distribution and different multilayer compositions on the dynamic response will also be discussed.

A. Barman

Date submitted: 06 Dec 2005

Electronic form version 1.4