Abstract Submitted
for the 4CF10 Meeting of
The American Physical Society

Spin Wave Resonance in Permalloy Nano Films Deposited by Magnetron Sputtering YIYAN SUN, YOUNG-YEAL SONG, MINGZHONG WU, Colorado State University, COLORADO STATE UNIVERSITY TEAM — It is well known that, in magnetic films with pinned surface spins, there exist standing spin wave resonance (SWR) modes across the film thickness. In films with nanometer thickness, these constrained modes have very large wave numbers and produce very high effective exchange fields and, therefore, can have a substantial influence on the magnetization dynamics and relaxation in these films as well as structures containing such films. This presentation reports on the measurement of SWR modes in Permalloy nano films and the identification of pinning mechanisms. The films were deposited by magnetron sputtering. The SWR measurements were carried out with a 17.3 GHz waveguide cavity, field modulation, and lock-in detection. The measurements indicate the following results. (1) The spins on the substrate side are partially pinned, and this pinning can be weakened or even eliminated through the use of different substrates. (2) The surface spins are unpinned. This is opposite to the general belief that the surface oxidation can give rise to the pinning of surface spins. (3) In very thin films, the resonance field for high-order modes can be extremely low due to very large SWR-associated exchange fields.

Yiyan Sun
Colorado State University

Date submitted: 08 Sep 2010 Electronic form version 1.4