Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

From exchange coupling to magnetic memory: how domains remember at nanoscale KARINE CHESNEL, BYU, Physics department, JOSEPH NELSON, BYU, ERIC FULLERTON, UCSD, MATT CAREY, Hitachi Global Storage, STEVE KEVAN, U Oregon — Magnetic memory, the ability of a material to remember its magnetic domain configuration throughout magnetization, offers potential technological interest for the data storage industry. One way to quantify the magnetic memory is to use Coherent X-ray Resonant Magnetic Scattering (XRMS), at synchrotron facilities. The light is tuned to resonant edges to optimize the magneto-optical contrast. When illuminated by coherent beam, the sample produces speckle patterns. Our approach is to cross-correlate patterns recorded at different field values throughout the magnetization cycle, and at different temperatures. We have studied the return point memory (RPM) that characterizes the memory after a full cycle, and developed a q-selective correlation analysis to study the spatial dependency of the memory. We will give here an overview of different type of memory behaviors, first showing disorder induced memory in thin CoPt films and influence of roughness, then demonstrating the ability to control the magnetic memory by inducing exchange bias (1). We will see how the local exchange couplings pin the magnetic domain in the ferromagnetic layer and lead the large memory enhancement at different spatial scales and under different field cooling conditions. (1) K.Chesnel et al, PRB **78**, 132409 (2008)

Karine Chesnel
BYU, Physics department

Date submitted: 12 Feb 2010 Electronic form version 1.4