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Mapping the spatial dependency of magnetic domain memory in [Co/Pd]IrMn films KARINE CHESNEL, JOSEPH NELSON, BRIAN WILCKEN, BYU, Physics Dept, ERIC FULLERTON, Hitachi, San Jose, CA, STEVE KEVAN, University of Oregon, Eugene — 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) tools, at synchrotron facilities. When illuminated by coherent beam, at a specific energy, the sample produces magnetic 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 domains in the ferromagnetic layer and lead the large memory enhancement at different spatial scales. (1) K.Chesnel et al, PRB **78**, 132409 (2008)

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