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**From exchange bias to magnetic memory** KARINE CHESNEL, BYU, STEVE KEVAN, U Oregon, ERIC FULLERTON, UCSD, JEFF KORTRIGHT, LBNL, OLAV HELLWIG, BRIAN WILCKEN, JOE NELSON, BYU — Magnetic memory, the ability of a material to remember its magnetic domains spatial configuration throughout magnetization cycling, is a key feature in ferromagnetic materials and 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. The light is tuned to the resonant edge of the magnetic element to optimize the magneto-optical contrast. When illuminated by the coherent beam the sample produces speckle patterns that are collected on two dimensional detectors. Our approach is to cross-correlate patterns recorded at different field values throughout the magnetization cycle, and at different temperatures. We are particularly interested in the return point memory (RPM) and the conjugate point memory (CPM) that characterize the memory after a full, or half cycle respectively. We will give here an overview of different type of memory behaviors, first showing disorder induced memory in thin CoPt films and the influence of the film roughness, then demonstrating the ability to control the magnetic memory by inducing exchange bias. We will see how the local exchange couplings pin the magnetic domain in the ferromagnetic layer and lead the large memory enhancement.

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