

Abstract Submitted
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From Exchange Bias to Magnetic Memory KARINE CHESNEL, BYU, Physics Dept, STEVE KEVAN, U Oregon, Physics Dept, ERIC FULLERTON, UCSD, MATT CAREY, Hitachi Global Storage, JEFF KORTRIGHT, LBNL, Material Sciences, BRIAN WILCKEN, JOSEPH NELSON, BYU — A better understanding and control of magnetic domain morphology and reversal processes in magnetic thin films is useful in the realm of perpendicular magnetic recording technology. We found the possibility to create magnetic domain memory in thin ferromagnetic films by inducing a spatially varying exchange coupling interactions. We evidenced this phenomenon in a perpendicular exchange bias film made of [Co/Pd] IrMn multilayers. Our coherent X-ray magnetic scattering speckle correlation study shows that the film exhibits no memory at room temperature but acquires a very high degree of magnetic memory, above 95% with subsequent field cycling when the sample is zero field cooled below the blocking temperature of the IrMn layers ($T < 275\text{K}$). [1]. We present here the memory's dependency with magnetic field, temperature, and cooling conditions. We also discuss the spatial dependency by analyzing finely the local speckle correlation as a function of scattering angle, thus indicating variations of memory with different spatial scales in the domain pattern. [1] Chesnel et al, PRB, 78, 132409 (2008).

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