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Magnetic Domain Dynamics Study in Dysprosium SAN-WEN CHEN, HONGYU GUO, XIANGSHUN LU, University of California San Diego, SUJOY ROY, KEOKI SEU, Lawrence Berkeley National Laboratory, KARINE DUMESNIL, University H. Poincare, France, SUNIL SINHA, University of California San Diego, UNIVERSITY OF CALIFORNIA SAN DIEGO TEAM, LAWRENCE BERKELEY NATIONAL LABORATORY COLLABORATION, UNIVERSITY H. POINCARE, FRANCE COLLABORATION — We have studied magnetic domain fluctuations in a Yttrium-Dysprosium-Yttrium tri-layer with X-ray photon correlation spectroscopy (XPCS) in conjunction with resonant soft x-ray magnetic scattering. Dysprosium possesses a helical antiferromagnetic ordering below its Néel temperature (T_N= 180K) and above its Curie temperature ($T_C \sim$ 85K). With resonant x-ray scattering, we observed the magnetic satellite peak at (0,0,q_m) due to the helical magnetic structure. We determined the transition temperature and found a shift in T_C from the bulk value and hysteresis behavior around T_C. The transverse correlation length showed a minimum at both T_C and T_N. With the coherent x-rays, we observed magnetic speckles from both static disorder and magnetic domains. The XPCS studies as a function of temperature showed that the magnetic domains are static up to 2000 seconds time scale when $T < 175$K. Close to T_N, there appears to be slow dynamics which might be due to domain wall fluctuation.

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