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Oscillatory domain wall motion in a single-crystal ultrathin Au/Co/Au system KEOKI A. SEU, Physics Department, University of Oregon and Advanced Light Source, Lawrence Berkeley National Laboratory, SUJOY ROY, Advanced Light Source, Lawrence Berkeley National Laboratory, SUNGKYUN PARK, Busan Center, Korea Basic Science Institute, Busan 609-735 Korea, CHARLES M. FALCO, College of Optical Sciences, University of Arizona, STEPHEN D. KEVAN, Physics Department, University of Oregon — We have used x-ray photon correlation spectroscopy together with resonance soft x-ray scattering to measure domain dynamics in a Au/Co/Au system that exhibits a spin reorientation phase transition (SRT) in the temperature range of 200-300 K. The incoming photon energy was tuned at the Co L_3 edge and the coherence is established with a $\sim$10 um pinhole. The resultant speckle pattern is measured with a CCD camera in time as a function of temperature 200 K to 300 K. The correlation coefficient, which is an indicator of domain wall dynamics, shows damped oscillatory behavior in time. The period of the oscillations is approximately 120 sec. The frequency and damping constant were found to depend on the length-scale and temperature changes through the phase transition. Our results show that the SRT dynamics on a mesoscopic length scale and slow time scale can be surprisingly complex.

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