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Quantum vs. Thermal Annealing of Magnetic Domain Walls in Elemental Chromium OLEG G. SHPYRKO, ERIC D. ISAACS, Center for Nanoscale Materials, Argonne National Laboratory, Argonne, IL, JONATHAN M. LOGAN, YEJUN FENG, RAFAEL JARAMILLO, THOMAS F. ROSENBAUM, James Franck Institute and Department of Physics, University of Chicago, Chicago, IL, PAUL ZSCHACK, Frederick Seitz Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL, GABRIEL AEPPLI, London Centre for Nanotechnology and Dpt of Physics and Astronomy, University College London, London, UK, MICHAEL SPRUNG, ALEC R. SANDY, Advanced Photon Source, Argonne National Laboratory, Argonne, IL — Dynamics of magnetic domain walls separating regions with different orientations of the spin (charge) density wave has been studied with x-ray photon correlated spectroscopy (XPCS) in bulk Cr samples. Measurements were carried out at temperatures ranging from 298K to 4K. Upon cooling down to 4K thermal exploration of energetic landscape is replaced by quantum tunneling between discrete low-energy configurations of domain walls. Direct comparison of coherent speckle pattern fluctuations for Bragg reflection and charge density wave satellite peak provides information about magnetic superlattice dynamics, deconvolved from the motion of underlying atomic lattice or beam components.

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