

Abstract Submitted  
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**X-ray imaging of chiral domains in Dy metal** J.C. LANG, A. CADY, D. HASKEL, G. SRAJER, Advanced Photon Source, Argonne National Lab, D. MCWHAN, Brookhaven National Lab (retired) — Domain growth has been measured in Dy metal using a circularly polarized x-ray beam both on cooling through the PM to AF transition, and on warming through the FM to AF transition. The difference in the scattered intensity between right and left handed incident x-rays was measured at the  $(0,0,4+\tau)$  peak, where  $\tau$  is the wave vector of the AF structure. On cooling from the PM to the AF phase, the chiral domains nucleate and grow to several hundred microns and no further change is observed with decreasing temperature. The size of the domains is assumed to be limited by defects. On warming from the FM phase the domain size is resolution limited and little domain growth is observed between  $T_c=90\text{K}$  and about  $140\text{K}$ . With further increase in temperature the domains grow to the hundreds of microns observed on cooling. Early neutron scattering measurements revealed a second harmonic with an intensity that decreased linearly to zero at  $140\text{K}$ .<sup>1</sup> We observe, a weak non- resonant reflection at  $2\tau$  in the charge ( $\sigma - \sigma$ ) channel rather than the magnetic ( $\sigma - \pi$ ) channel. This suggests that there is a distortion of the structure that is hindering domain wall motion at low temperatures. Work at the Advanced Photon Source was supported by the DOE, Office of Basic Sciences, under contract no. W- 31-109-Eng-38.

<sup>1</sup>M.K. Wilkinson et al., J. Appl. Phys. 32, 485 (1961).

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