

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Magnetic soft X-ray microscopy at 10nm spatial resolution¹ PETER FISCHER, WEILUN CHAO, MI-YOUNG IM, ERIK ANDERSON, CXRO LBNL Berkeley CA — Magnetic soft X-ray microscopy, which combines high spatial and temporal resolution with elemental specificity by utilizing the specific features of X-ray magnetic circular dichroism effects is a unique and powerful analytical technique to image fast spin dynamics of nanoscale magnetism [1]. The spatial resolution is determined by Fresnel zone plate lenses used as diffractive optics. FZPs are fabricated by state-of-the-art lithography techniques and the challenge is to produce a dense, circular line pattern with a high aspect ratio to achieve high efficiency. Using an overlay technique [2-3], which requires high position accuracy of the e-beam writer, FZPs with 12nm outermost zone width could be fabricated. Implementing this optic at BL 6.1.2 at the ALS in Berkeley CA, we have demonstrated that a 10nm line and space test pattern can be clearly resolved. First magnetic images of a PtCo film with a pronounced perpendicular anisotropy will be presented. Further progress to below 10nm can be anticipated in the near future.

[1] P. Fischer, IEEE Transactions on Magnetics, 44(7) 1900 (2008)

[2] W. Chao, et al. Nature 435, 1210 (2005)

[3] W. Chao, et al., Optics Express 17(20) 17669 (2009)

¹This work was supported by the U.S. Department of Energy under Contract No. DE-AC02-05-CH11231.

Peter Fischer
CXRO LBNL Berkeley CA

Date submitted: 23 Dec 2010

Electronic form version 1.4