Session: MI-TuA9 **Anisotropic X-Ray Magnetic Linear Dichroism at the Fe $L_{2,3}$ Edges in Fe_3O_4 Thin Films** **Abstract # 521**

Author(s)	*Presenter*	*Correspond*
E. Arenholz; Lawrence Berkeley National Laboratory	*X*	*X*
G. van der Laan; Daresbury Laboratory, UK		
R.V. Chopdekar; UC Berkeley and Cornell University		
Y. Suzuki; UC Berkeley		

Abstract:

X ray magnetic dichroism (XMD) spectroscopies utilizing synchrotron radiation are important tools for the study of magnetic solids. XMD is unique in its intrinsic element specificity and chemical-site sensitivity that allows the separation of the contributions of multiple magnetic species in alloys or layered systems. Most importantly, theoretically derived sum rules link, for example, x-ray magnetic circular dichroism intensities to spin and orbital magnetic moments enabling the use of polarized x rays for quantitative magnetometry. Although magnetic spectroscopy techniques have found widespread use for the study of magnetic systems, very fundamental aspects like the dependence of the XMLD signal on the relative orientation of external magnetic field, x-ray polarization, and crystalline axes have not been studied in detail to date. In this contribution, we present a systematic study of the Fe $L_{2,3}$ XMLD in ferrimagnetic Fe_3O_4(001) and (011) thin films. The Fe $L_{2,3}$ XMLD is found to exhibit a strong dependence on the relative orientation of external magnetic field, x-ray polarization, and crystal lattice. These spectra can be used as a sensitive probe for the electronic and magnetic structure. We will show that all XMLD spectra can be described as a linear combination of three fundamental spectra and that the angular dependence can be derived from atomic calculations based on the crystal field symmetry.

Note: Requested an Oral Session.