Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Optimization of MOKE Setups: Analyzing Experimental Assemblies Using Jones Matrix Formalism[1] SRINIVAS POLISETTY, JEREMY SCHEFFLER, SARBESWAR SAHOO, CHRISTIAN BINEK, University of Nebraska-Lincoln — We report on the optimization of Magneto Optical Kerr setups. Photoelastic modulation and phase sensitive detector methodology have been used to measure the first and second harmonics of the reflected light intensity related to the magnetization-dependent off-diagonal reflection coefficients $r_{ps/sp}$ of the sample's dielectric tensor. The latter elements determine the Kerr ellipticity ε_K and rotation θ_K. Jones matrix formalism has been used to analyze a large variety of arrangements of the optical elements involved in setups for longitudinal Kerr measurements with incoming s-polarized light. Relative analyzer and polarizer orientations have been varied with respect to each other and with respect to the retardation axis of the modulator. Different configurations have been analyzed and experimentally studied by measuring magnetic Kerr-hysteresis loops on a Co/CoO bilayer sample. We find that one configuration stands out by doubling the first as well as second harmonic intensities and, hence, the signal to noise ratio. Inefficient setups show first and second harmonic signals involving non-magnetic background contributions of r_p and r_s.

[1]Work supported by NSF through career DMR-0547887, the Nebraska Research Initiative, and the NSF MRSEC Program DMR-0213808.

Srinivas Polisetty
University of Nebraska-Lincoln

Date submitted: 20 Nov 2007 Electronic form version 1.4