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Observation of In Plane Magnetization Reversal Using Polarization Dependent Magneto-optical Kerr Effect HENDRIK OHLDAG, Stanford Synchrotron Radiation Lightsource, Menlo Park, CA USA, FRANZ HILLENBRECHT, Institute for Solid State Research, Juelich Germany — We present an experimental setup for in plane two axis magnetometry by employing the polarization dependence of the magneto-optical Kerr effect. (MOKE). The proposed approach allows for observing the complete in plane reversal process during a hysteresis loop. For this purpose a conventional setup to measure longitudinal MOKE with crossed polarizers is extended by a Faraday cell to compensate for the rotation of the polarization vector caused by the magnetized sample. This detection scheme enables us to observe hysteresis loops of single monolayer. Using a Jonesmatrix formalism we are able to derive expressions for the Kerr rotation using oblique incident polarization, allowing for extracting 2-dimensional vectorial information about the magnetization reversal process in the plane of the sample surface. The approach can be further extended to extract all three components of the magnetization by acquiring more than two loops. Since this setup does not require to change the sample geometry *in situ* it can be easily attached to an existing ultra high vacuum setup.

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