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Dichroism Soft X-ray Absorption Spectromicroscopy and Antiferromagnetic Surfaces and Interfaces HENDRIK OHLDAG, JOACHIM STÖHR, Stanford Synchrotron Radiation Laboratory, ANDREAS SCHOLL, Advanced Light Source — Synchrotron based dichroism x-ray absorption spectro-microscopy (dichroism XAS) is an excellent tool for the investigation of magnetic heterostructures, because of its ability to address antiferromagnetic (AF), ferromagnetic (FM), chemical and structural order of different elements in an unknown sample. Even more important, dichroism XAS can be used as a contrast mechanism in a photoemission electron microscope (PEEM) to characterize surfaces, buried interfaces and nanostructures with high spatial resolution (∼50nm) and temporal resolution (100ps). In this paper we present results of our research focusing on AF/FM exchange coupling In this area dichroism XAS has helped to improve our insight tremendously over recent years because conventional magnetic imaging techniques are not able to address the AF order which is a key ingredient in these systems. For the first time we were able to correlate the AF, FM, crystallographic and interfacial domains. Furthermore we could identify and analyze thestructure of lateral AF domain walls and extract quantitative information about the relevant magnetic anisotropy energies in NiO.

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