Title

Buried-interface characterization in magnetic nanostructures using standing wave-excited x-ray emission and resonant inelastic x-ray scattering

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Buried-interface characterization in magnetic nanostructures using standing wave-excited x-ray emission and resonant inelastic x-ray scattering MASAMITSU WATANABE, RIKEN / LBNL, BRIAN SELL, UC Davis / LBNL, SEE-HUN YANG, IBM Almaden, BONGJIN MUN, LBNL, NORMAN MANNELLA, Stanford / LBNL / UC Davis, LONG PHAM, UC Davis / LBNL, STEPHENIE RITCHEY, UC Davis / LBNL, AKIRA NAMBU, Univ. of Tokyo / LBNL, FARHAD SALMASSI, LBNL, JINGHUA GUO, LBNL, JEFFREY KORTRIGHT, LBNL, S.S.P. PARKIN, IBM Almaden, CHARLES FADLEY, LBNL / UC Davis — Yang et al. (J. Phys. Cond. Matt. 14, L406 (2002)) have discussed a new method for studying buried interfaces using soft x-ray standing waves created by Bragg reflection from a multilayer mirror, combined with a wedge-shaped sample profile. Prior work has been based on photoemission, a photon-in/electron-out spectroscopy. We will here discuss the first experimental results of applying this method via more bulk-sensitive photon-in/photon-out spectroscopies: x-ray emission (XES) and resonant inelastic x-ray scattering (RIXS). We have measured XES and RIXS intensities from an Fe/Cr bilayer that is a prototypical giant magnetoresistance combination via both sample-scanning and rocking-curve methods. Magnetic circular dichroism has also been measured in Fe RIXS spectra. Combining this data with x-ray optical calculations permits determining the compositional and magnetic structure of the Fe/Cr interface. Work supported by DOE Off. of Science, Basic Energy Sciences, Mat. Sci. Div.

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