PROBING THE ELECTRONIC AND MAGNETIC PROPERTIES OF BULK MATERIALS AND BURIED LAYERS AND INTERFACES WITH STANDING-WAVE AND HARD-X-RAY PHOTOEMISSION

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In this lecture, I will discuss some new directions in soft x-ray photoemission (XPS, SXPS) and hard x-ray photoemission (HXPS, HAXPES, HIKE) by my group and its several collaborators [1]-[12], including experiments carried out at the ALS, BESSY, SPring8, Petra III, and SLS. These involve combined SXPS and HXPS studies of buried layers and interfaces in magnetic and transition-metal oxide multilayers [5, 6, 8, 10], hard x-ray photoemission studies of the bulk electronic structure of some spintronic materials [4, 7, 11]; including band-offset measurements in oxide multilayers [12]; the use of standing waves from multilayer mirrors to enhance depth contrast in spectroscopy [5, 6, 10], as well as in angle-resolved photoemission (ARPES) [1, 5] and photoelectron microscopy [3]; and the prospects for carrying out bulk sensitive hard x-ray ARPES (HARPES) [9] and hard x-ray photoelectron diffraction (HXPD) [2].

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