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## **Some New Directions in Surface and Interface Science Studies Using Synchrotron Radiation**

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Several new aspects of soft x-ray photoelectron spectroscopy (XPS) and related x-ray emission and scattering experiments making use of third-generation synchrotron radiation will be discussed : time- and chemical state-resolved XPS, which permits following surface reactions in real time ; extension of XPS measurements into the multi-torr pressure regime ; XPS excited by x-ray standing waves from synthetic multilayer substrates, which permits probing species at surfaces and at buried interfaces ; multi-atom resonant XPS and resonant x-ray scattering, which hold promise of directly determining near-neighbor atomic identities and other bonding and magnetic properties ; measurements with variable light polarization and/or electron spin resolution for studying magnetic systems and strongly correlated materials holographic methods for imaging atomic structure making use of both electrons and x-rays.

First applications of these methods to metal oxidation, metal oxides, and metallic bilayers will be considered, and likely future directions of development will be discussed.

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