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X-ray Absorption Spectroscopy in an Age of Insertion Devices

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The first dedicated beamline for X-ray Absorption Spectroscopy (XAS) was built in 1974, since then XAS has become one of the core competencies of synchrotron radiation facilities and an essential tool for a broad range of scientific disciplines. XAS is a technique that remains closely associated with its roots in bend magnet sources and second generation facilities. In recent years, insertion device beamlines, often built on wiggler sources, have offered significant new measurement capabilities which capitalize on the increased flux offered by these insertion devices. Some beamlines, most notably ID26 at ESRF, use the high flux of the insertion device to replace conventional integrating or energy dispersive detectors with wavelength dispersive spectrometers. These crystal spectrometry systems both enhance the XAS capabilities of the beamline and make available other inner shell spectroscopic techniques such as X-ray Emission Spectroscopy and X-ray Raman Spectroscopy.

Even with such exciting developments in photon delivery and photon detection, conventional XAS beamlines remain highly productive, scientifically relevant, and popular to the point of substantial over-subscription. In this talk, I will introduce these novel spectroscopic techniques and discuss how they can complement a conventional XAS research campaign, in some cases providing specific details unavailable using conventional XAS or other measurement techniques. Finally, I will provide a brief introduction to the Inner Shell Spectroscopy beamline being built at the new completed National Synchrotron Light Source II.

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