Application of area detector to simultaneous x-ray diffraction and x-ray absorption spectroscopy measurements

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X-ray diffraction (XRD) and X-ray absorption spectroscopy (XAS) are two main x-ray techniques in synchrotron radiation facilities. In this talk, I will present an experimental setup capable of performing simultaneous XRD and XAS measurements by the application of a pixel-array area detector. For XRD, the momentum transfer in specular diffraction was measured by scanning the X-ray energy with fixed incoming and outgoing x-ray angles. By selecting a small fixed region of the detector to collect the XRD signal, the rest of the area was available for collecting the x-ray fluorescence for XAS measurements. The simultaneous measurement of XRD and X-ray absorption near edge structure for Pr$_{0.67}$Sr$_{0.33}$MnO$_3$ film was demonstrated as a proof of principle for future time-resolved pump-probe measurements. A static sample makes it easy to maintain an accurate overlap of the X-ray spot and laser pump beam.