

New Developments in Multi-Sensor Silicon Drift Detectors

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In many x-ray spectroscopy applications, it is important to acquire data quickly to shorten the analysis time and maximise the statistical accuracy. This is especially important for synchrotron radiation studies, where highly focused excitation beams may be used to generate thousands of fluorescence spectra during 2D and 3D sample scans. For the x-ray fluorescence detector, this means maximising the solid angle presented while ensuring that the incident count rate remains within a practical range. High speed Silicon Drift Detectors, operated together with the latest generation of digital pulse processors, allow count rates of a few million cps. However, for high solid angle detection systems it is often necessary to use multiple sensors to process the available number of events. The principles behind linear and circular focused sensor arrays are discussed and practical examples and performance data are presented. Recent further developments in fluorescence detector design have extended the availability of optimised multi-sensor solutions to applications where more demanding geometrical constraints are imposed. Details of these unique developments are presented.