Spectroscopy detector systems at Diamond Light Source

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With three beam lines and four end station devoted to XAFS experiments, fluorescence detectors for XAFS are very important detector systems for Diamond. Building on the systems already developed at SRS (Daresbury) Diamond further developed the fluorescence detectors to keep pace with the increased photon flux. Despite this detectors are still the limiting factor in this class of experiments. Investigations have been carried out at Diamond to improve the throughput of fluorescence detectors.

In this talk it will be show how the fluorescence detector systems of Diamond were developed based on the technology available at Daresbury and what are the systems presently used at Diamond. In addition it will be reported the investigations carried out in the field of signal cross talk and miniaturization of the detector that aim at developing detector systems with higher throughput. It has been found out that taking into account properly of the cross talk in multi-channel detectors can almost double the counting rate for a given energy resolution. In addition Diamond investigated the use of CMOS preamplifiers with multi-element germanium detectors with a pad pitch of 1mm that can provide a path to the miniaturization of this class of detectors. The results were very promising and no show-stoppers were identified.