

Challenging SAXS/WAXS Experiments at ESRF Undulator Beamlines

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I will discuss several challenging SAXS/WAXS experiments, which are dependant on the availability of advanced detectors with single photon counting capability, high dynamic rate and short time framing capability. Thus single fiber muscle scattering experiments with time framing in the ms-range have become possible at ID02 by the use of the RAPID detector developed at Daresbury. Future experiments will want to address weaker reflections, subms time frames and other proteins. Microbeam SAXS/WAXS experiments with a high-resolution area detector at ID13 avoid problems of synchronization of two detectors but imply higher radiation damage than experiments with larger X-ray beams and separate detectors. Radiation damage has therefore to be limited by using the shortest possible time frames. Thus current technology allows studying the hydration of single starch granules with 100 ms time framing for a 700 nm X-ray beam. As data rates increase due to faster detectors and nanometer-sized beams, online data analysis and fast batch processing will become more and more an issue.