

A COMPACT HIGH-BRILLIANCE SAXS/SWAXS/GISAXS -INSTRUMENT FOR LABORATORY USE

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A compact modular laboratory unit for 2-D SAXS, SWAXS and GISAXS with high brilliance is presented, that facilitates nanostructure analysis of bulk materials, liquid crystals, (bio-) polymer or nanoparticle solutions, and thin solid films. The system, S3-MICRO, is based upon a combination of a point-focus microbeam delivery system (GeniX from Xenocs, Grenoble, France) working at a maximum power of 50 W with the Hecus S3-camera architecture with 1-D and 2-D detectors. With monochromatized Cu radiation, a SAXS resolution of $Q_{\min} > 0.003 \text{ \AA}^{-1}$, corresponding to d-values of $\sim 2000 \text{ \AA}$ can be easily achieved. Due to the point-cross-section of the primary beam, desmearing of the scattering data is not required. The beam brilliance exceeds that of high-power rotating-anode SAXS systems by a factor of > 3 , and that of conventional line-focussing systems by two orders of magnitude. This allows to reduce measuring times down to seconds for many problems in nanostructure research, facilitating high-throughput (e.g in structural proteomics) and on-line process analytical applications. Due to the low electrical power and the consequently minimal cooling requirements, the system design is extremely compact and economical, and therefore optimally suited for installation in multi-facility analytical laboratories, or in mobile test stations. The software package includes modules for system control (SWAXView, Labview® based) and for on-line data analysis (EASYSWAX) supporting automatic multi-sample analysis and routine analytical applications in R&D and QC.