

MICROFOCUSING X-RAY EQUIPMENT FOR THE LAB DIFFRACTOMETER

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The increasing importance of macromolecular crystallography, microdiffraction, and small angle X-ray scattering has led to a rising demand for highly intense X-ray sources enabling the analysis of very small and weakly scattering samples. High-brilliance microfocusing X-ray sources are characterized by high power loads in spot sizes of $\leq 100 \mu\text{m}$ at the anode and deliver an intense, divergent beam which in many cases needs to be shaped by X-ray optics. Synthetic multilayer mirrors are well established as excellent beam-shaping devices with a good spectral purity [1,2]. Their high reflectivity and broad rocking curve make them the ideal optics for conserving the source brilliance [3]. The combination of a state-of-the-art high brilliance X-ray source with a dedicated collimating or focusing multilayer mirror, therefore, provides an intense X-ray beam with a high flux density onto the sample and a custom-made 2D beam divergence [4-6].

New stationary microfocusing sealed tube X-ray sources, such as Incoatec Microfocus Source ($\text{I}\mu\text{S}^{\text{TM}}$), are low-maintenance high-brilliance sources which significantly improve the performance of home-lab instruments when combined with multilayer mirrors. We will present results on the use of the $\text{I}\mu\text{S}$ in protein and small molecule crystallography, and in small angle X-ray scattering. The results show that the performance of such an air-cooled stationary microfocusing sealed tube is much better than that of standard sealed tube systems, and comparable to traditional rotating anode sources with a significantly reduced maintenance.

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