

GENERATING HIGH BRILLIANCE X-RAY BEAMS FOR X-RAY DIFFRACTION AND SCATTERING APPLICATIONS

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Today a large fraction of the X-ray analytical systems used in two-dimensional diffraction and scattering applications are still equipped with non-optimized beam-generating schemes that combine high power sealed tubes or rotating anodes with large source-sizes with inefficient optical schemes. With the advent of single reflection graded multilayer optics and efficient, low power micro-focus sealed tubes, it has become advantageous and cost-effective to replace these high power systems with this more efficient and robust technology.

The key to this new technology are Xenocs' high performance, single reflection X-ray optics that couple optimally to small x-ray sources. The relative figure-of-merit for X-ray beams is the brilliance, which typically is expressed as photons/mrad²/mm²/s in the relevant part of the spectrum (i.e. Cu K-alpha), and which can never exceed the brilliance of the source (Liouville's Theorem). Xenocs' single reflection optics optimally conserve the brilliance of these sources, resulting in extremely bright X-ray beams.

The GeniX product line from Xenocs combines a micro-focus X-ray tube with high-efficiency Xenocs X-ray optics, and offers a high performance solution with clearly defined characteristics (beam size, divergence, spectral purity, flux...). Compared to high power sealed tubes, the Genix solution offers superior brilliance enabling faster data collection in a package with a small footprint, low power consumption, and low facility requirements. The low maintenance requirements of this solution also make it appealing as a replacement for traditional rotating anodes.

In addition to presenting the GeniX product platform we present data obtained with the GeniX to demonstrate its performance and its value as an efficient, cost-effective X-ray beam delivery solution for a variety of applications including single crystal and protein crystallography, high pressure diffraction, and SAXS.