

## Current Status of the Liquid-Metal-Jet X-ray Source Technology

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High-end x-ray diffraction and scattering techniques such as high-resolution XRD, protein crystallography, and SAXS rely heavily on the x-ray source brightness for resolution and exposure time. Traditional solid or rotating anode x-ray tubes are typically limited in brightness by when the e-beam power density melts the anode. The liquid-metal-jet technology has overcome this limitation by using an anode that is already in the molten state.

We have previously demonstrated prototype performance of a metal-jet anode x-ray source concept [1-3] with unprecedented brightness in the range of one order of magnitude above current state-of-the art sources. Over the last years, the liquid-metal-jet technology has developed from prototypes into fully operational and stable X-ray tubes running in many labs over the world. SAXS and SCD has been identified as a key application of the x-ray tube technology, since these applications benefits greatly from small spot-sizes and high-brightness, to achieve a high flux x-ray beam with low divergence. Multiple users and system manufacturers has since installed the metal-jet anode x-ray source into their SAXS and SCD set-ups with successful results [4, 5].

This presentation will review the status of the technology specifically in terms of stability, lifetime, flux and brightness. It will also discuss details of the liquid-metal-jet technology with a focus on the fundamental limitations of the technology. It will furthermore refer to some recent SAXS, SCD and GISAXS data from users of the metal-jet x-ray tube technology.

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