MetalJet source for x- ray scattering and diffraction studies

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High-end x-ray scattering techniques such as SAXS, BIO-SAXS, non-ambient SAXS and GISAXS 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. With bright compact sources, time resolved studies could be achieved even in the home laboratory. We report brightness of 6.5 x 10^{10} photons/(s·mm^2·mrad^2·line) over a spot size of 10 µm FWHM.

Over the last years, the liquid-metal-jet technology has developed from prototypes into fully operational and stable X-ray tubes running in more than 8 labs over the world. X-ray crystallography and Small Angle X-ray Scattering (SAXS) have been identified as key applications, since these applications benefit from small spot-sizes, high-brightness in combination with a need for a stable output. To achieve a single-crystal-diffraction (SCD) platform addressing the needs of the most demanding crystallographers, the system manufacturer and multiple users have since installed the MetalJet X-ray source into their SCD set-ups with successful results [4]. With the high brightness from the liquid-metal-jet X-ray source, *in-situ* SAXS studies can be performed – even in the home laboratory [5,6].

This presentation will review the current status of the metal-jet technology specifically in terms of stability, lifetime, flux and optics. It will furthermore refer to some recent SAXS, GI-SAXS and single crystal data from users of metal-jet x-ray tubes.

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