

MetalJet X-ray Sources for High-Speed Imaging

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Since more than ten years, MetalJet sources, based on liquid-metal-jet technology [1], are successfully operated in many labs over the world. By using a high-speed jet of liquid metal, instead of the traditional solid- or rotating anode, it has been demonstrated that a much higher power can be applied to the anode. Since melting of the anode is thereby no longer a problem as it is already molten, MetalJet has achieved an at least 10-100x higher brightness than the conventional solid-anode microfocus tube with the X-ray spot size range of 5- 40 μm .

Key applications of the MetalJet includes X-ray diffraction and scattering, but several publications have also shown very impressive imaging results using MetalJet technology, especially imaging applications that has traditionally been limited to synchrotron studies – like ptychography [2], X-ray microscopy [3, 4] and phase-contrast imaging [5]. The transfer of these imaging technologies from the synchrotron to the home laboratory are enabled by the high brightness of the MetalJet.

During 2021 the latest version of the MetalJet X-ray source, the MetalJet E1+, was introduced which can run up to 1 kW of power at a microfocus X-ray spot (30 μm). This very high power loading enables really fast X-ray imaging, and shows great promise for fast industrial X-ray inspection with high resolution. During the presentation, we will show how we achieved sub-second CT-scans of Li-ion batteries.

References:

- [1] O Hemberg et al., <https://doi.org/10.1063/1.1602157>
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- [3] C Fella et al., <https://doi.org/10.1063/1.5011042>
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- [5] RP Murrie et al., <https://doi.org/10.1038/s41598-020-67633-y>