excillum

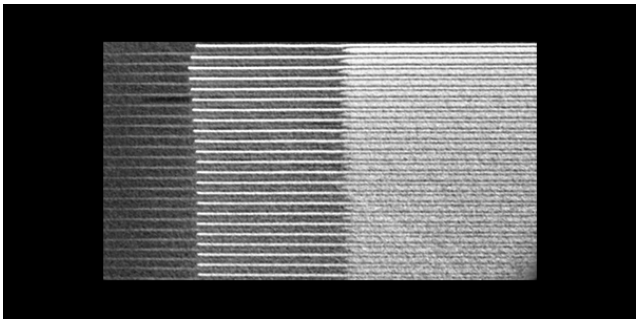
# Improve first-pass yield **in battery manufacturing**

**Reliable energy storage and efficient renewable energy production are key to a sustainable future. Fast-changing global vehicle fleets will require exponential growth in the number of battery cells produced. Excillum's MetalJet X-ray sources enable full inline CT scanning capabilities with micrometer resolution, giving manufacturers the high-speed, high-resolution 3D imaging they need to increase yield as well as ensure product safety and quality at the highest throughputs.**

# Improve yield by one-second CT scans

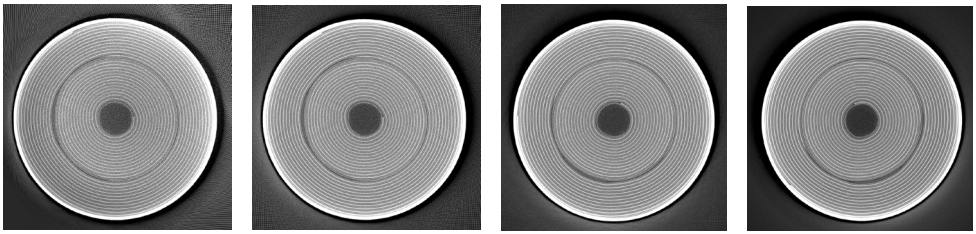
Inline X-ray computed tomography (CT) is a powerful inspection technique that can further reduce the risk of defects and recalls, compared to today's 2D X-ray inspection techniques. Furthermore, when X-ray CT is integrated in cell assembly, defects can be automatically detected in real time to enable immediate corrective actions, thereby eliminating yield losses and quickening change control-type processes.

However, to achieve the levels of inspection coverage, throughput and resolution necessary for high-volume battery production, a high-power X-ray source with a micrometer-sized X-ray spot is necessary. The Excillum MetalJet E1+ source makes this possible, achieving a full scan with micrometer resolution in just one second, or less.



*1 sec CT scan of a pouch cell*

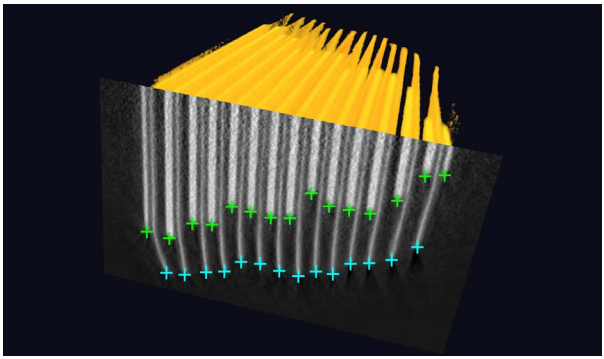
*CT scans of a cylindrical cell captured in various times:*



*0.22 sec* *0.33 sec* *0.5 sec* *1 sec*

**Anode-cathode overhang**
An internal feature to be inspected during manufacturing of a battery is the anode overhang. The anode should be dimensioned to overlap the cathode. To produce this with repeatability puts high demands on the manufacturing and process precisions. To inspect this with precision in prismatic battery cells, X-ray CT is a pre-requisite. Furthermore, to have a 3D model of each produced battery cell can be very helpful for forensics in case a battery cell fails in the field – in order to minimize a recall to an as small volume as possible.

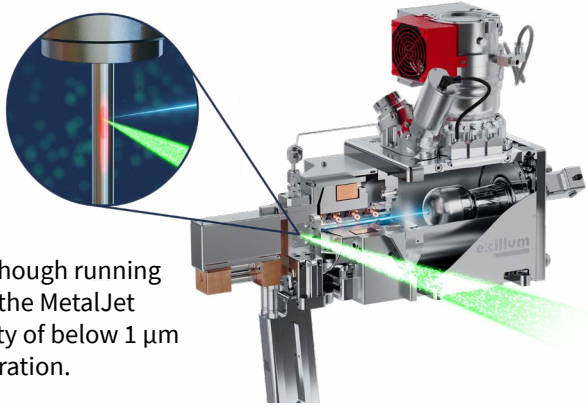
*1 sec 3D CT scan of a prismatic cell*



# MetalJet E1+ for high-speed full inline CT scanning

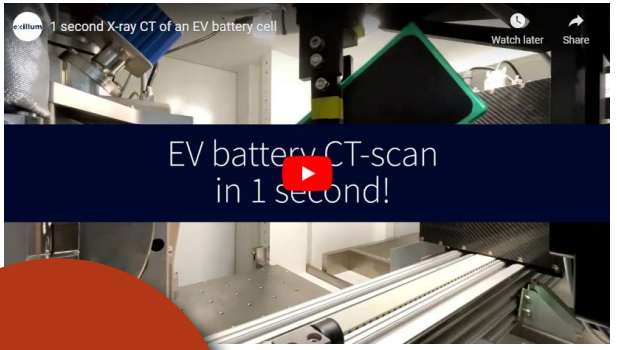
The MetalJet E1+ delivers 17 times higher X-ray brightness compared to conventional microfocus X-ray sources, which enables fast inline CT inspection in battery cell manufacturing.

Excillum's MetalJet X-ray tubes feature a liquid-metal jet anode, eliminating traditional X-ray source power limitations caused by anode damage. This innovation supports higher electron-beam power, resulting in significantly increased X-ray brightness.



- **Built for 24/7 continuous performance.** The MetalJet E1+ is designed for high-throughput, 100% duty-cycle operation with up to once-per-year preventive maintenance cycles.
- **Sub-µm positional stability.** Although running at a high thermal load of 1000 W, the MetalJet E1+ maintains a positional stability of below 1 µm during continuous long-term operation.

# Watch video
# 1 second X-ray CT of an EV battery cell




Scan to view

**Interested in a demo? Contact us!**

## About Excillum

Excillum is the global source for X-ray innovation. We develop, manufacture, and service the world's brightest and most advanced industrial and laboratory X-ray sources. In close collaboration with best-in-class scientific, industrial and system integration partners we enable new science, improve medicine and enhance manufacturing. Headquartered in Stockholm, Sweden, Excillum is pushing the limits of X-ray source technologies since 2007.

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