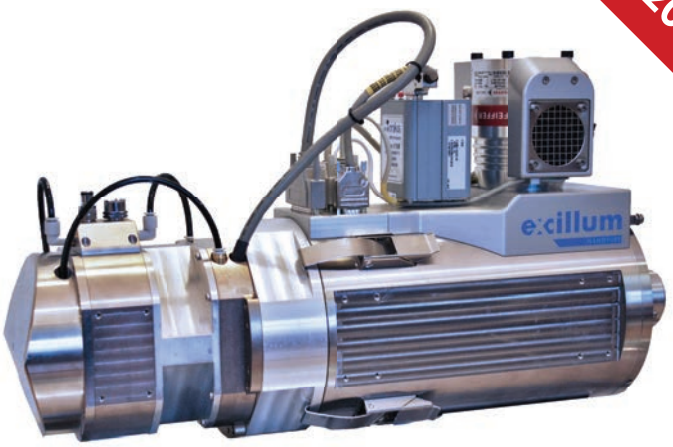
NanoTube N1 60 kV

Uncompromising Nano Performance

Launching at XRM 2016

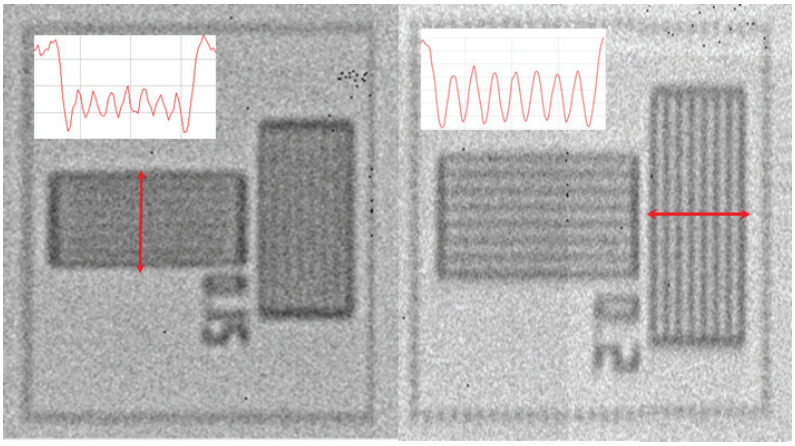
The Nanotube N1 60 kV is based on advanced electron optics refined from the workhorse MetalJet e-beam platform and the latest tungsten-diamond transmission target technology. Automatic e-beam focusing and astigmatism correction ensures that the smallest possible truly round spot is achieved at any voltage and current setting. The NanoTube furthermore have the unique feature that it internally measures and reports the current spot size. In addition advanced cooling and thermal design results in extreme stability over long exposures. All in all this enables an unprecedented true resolution of 150 nm lines and spaces.



Features and Benefits

- Superior spot quality with automatic e-beam focusing and astigmatism correction
- Internal absolute spot size measurement
- Tungsten-diamond transmission target
- LaB_6 long-life cathode
- Integrated cooling for ultimate spot stability
- Wedge shaped front for excellent geometrical access to X-ray spot
- Controlled through user friendly GUI or remotely through TCP/IP protocol

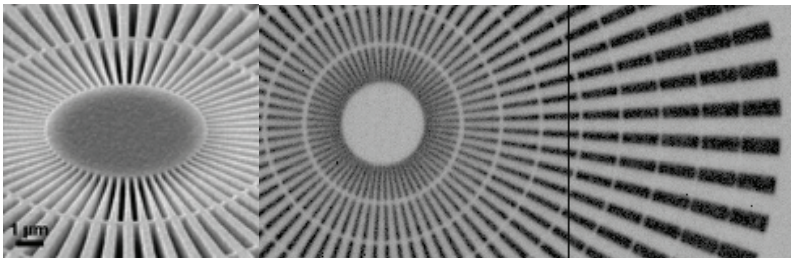
Resolution Examples



Projection radiographs of the standard JIMA RT RC-04 150 nm (left) and 200 nm (right) resolution pattern caputered using the NanoTube.

Examples of 150 and 200 nm lines and spaces on the standard JIMA RT RC-04 resolution chart clearly resolved.

From experiment in collaboration with Fraunhofer EZRT using a Si Timepix detector.



SEM micrograph of a siemens star on the left, and a projection radiograph captured using the NanoTube on the right.

The true round spot of the NanoTube is demonstrated by the highly symmetric images of a Siemens-star resolution target. The innermost features are 150 nm.

From experiment in collaboration with Fraunhofer IIS (NanoCT systems) using a Dectris PILATUS3 X CdTe 300K-W detector.

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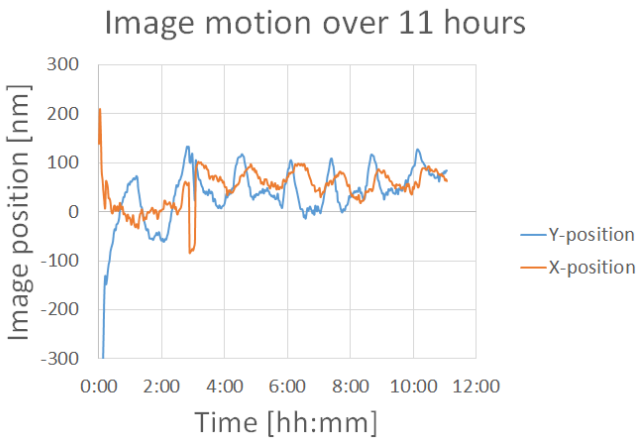
Positional Stability Example

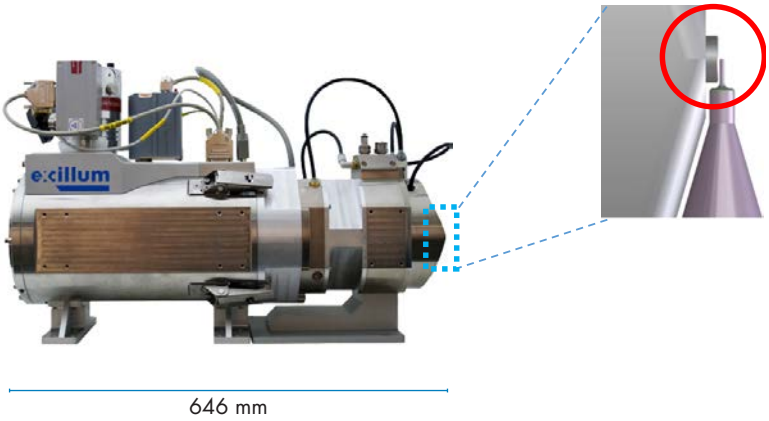
Thanks to the advanced e-beam system of the NanoTube and the integrated thermal control, excellent long term stability is achieved. This graph illustrates the motion of the image (in object coordinates) of the Siemens star mentioned above over 400 exposures during 11 h. It is worth noticing that this image motion also includes motion of the complete setup with sample, stages and detector etc., so that the actual motion of the X-ray spot is smaller.



Excellent Geometrical Access

The end of the transmission target is the most protruding surface to allow for a sample to get as close as possible to the X-ray sample.

The front is furthermore wedge-shaped to allow for a sturdy cone-shaped sample holder.



Technical Specifications

Voltage	10-60 kV	Best resolution	150 nm (lines and spaces e.g. JIMA)
Max. emitted power	6 W	Target material	Tungsten (W) on diamond
Max. power absorbed in anode	5 W	Target type	Transmission
Min. focus-object distance	100 µm	Long term spot stability	< 50 nm [1]

[1] Standard deviation over several hours after initial warm-up.

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REDEFINING THE X-RAY TUBE

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The development of the NanoTube has been partly funded by the European Union Seventh Framework Programme (FP7/2007-2013) through Excillum´s participation in the NanoXCT program (grant agreement no 280987)