

The logo for SIGRAY, featuring a stylized Greek letter sigma symbol (Σ) in a dark blue square followed by the word "SIGRAY" in a bold, blue, sans-serif font.

Σ SIGRAY

TriLambda-40

HIGHEST PERFORMANCE 3D X-RAY MICROSCOPE / NANO-CT

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TriLambda is zoneplate-based to achieve unprecedented resolutions

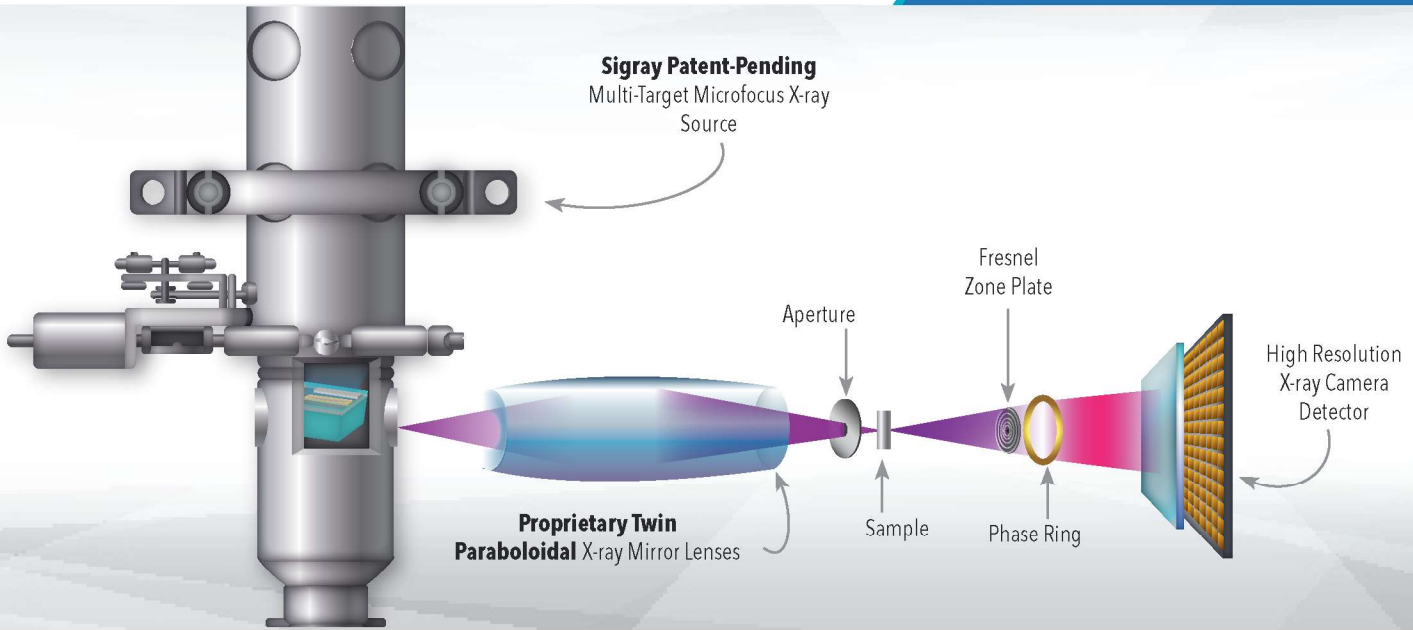
High Resolution Mode: 40 nm spatial resolution | 10 nm voxel

Large Field of View Mode: 120 nm spatial | 40 nm voxel

Highest Resolution 3D X-ray Microscope, with Multi-Energy Flexibility for Accelerating Research in Advanced Laboratories

TriLambda Advantages at a Glance

- » Highest resolution 3D XRM, with **40 nanometer spatial resolution**
- » **Patent-pending x-ray source** with multiple x-ray source target materials for unique advantages including dual energy imaging and optimization of acquisition speed
- » Optimized throughput for time-based (4D) & in-situ studies
- » Designed by the world's **foremost experts** on x-ray microscopes



Bring Synchrotron XRM Capabilities to Your Lab

Highest resolution x-ray microscope with multi-energy capabilities

Sigray's TriLambda™-40 3D nano x-ray microscope is the highest resolution (40 nm) laboratory x-ray microscope in the world, with the power to image internal nanostructure and optimized performance in a wide range of samples, spanning everything from cells and polymers to geological samples and metals.

What sets the TriLambda apart?

The TriLambda is a tri-energy system that provides the highest resolution on the market. It is one of two zoneplate-based nanoCTs on the market, both developed by Dr. Wenbing Yun, who is well-recognized as a pioneer in x-ray microscopy and was the founder of Xradia (now the x-ray microscope division of Carl Zeiss). The system features significant improvements over previous technology, including better resolution, increased field of view (FOV), and multi-energy capabilities for faster data acquisition and increased contrast.

Patent-pending X-ray Technology: Source & Optics

Achieving the unparalleled performance of the TriLambda requires major innovations in key component technology.

Sigray has developed an ultrahigh brightness x-ray source featuring an x-ray target comprised of multiple materials in close thermal contact with a diamond substrate. Software selection of the target material enables rapid switching between different characteristic x-ray energies of each material, for example: 5.4 keV (Cr), 6.4 keV (Fe), 8 keV (Cu), and more. The flexibility in energy choice overcomes the trade-off of other systems in which only a single operational x-ray energy must be selected upfront.

Coupled to the source are twin paraboloidal microfocusing x-ray optics, a type of optic exclusively fabricated by Sigray. Compared to ellipsoidal capillaries, these optics provide uniform illumination of the zone plate and increased imaging performance.

What can the TriLambda™ offer your lab?

The TriLambda provides essential correlative capabilities by fulfilling the critical gap between light microscopy and electron microscopy analysis.

The range of applications enabled by the TriLambda include:

Application	
Biology	Correlative cellular mapping and nanoparticle distribution
Materials Science	Structural characterization of battery electrode analysis In situ and time-based understanding of microstructural evolution
Geology	Nanoporosity in shales and carbontes dual energy analysis for mineralogy
Semiconductor	Metrology and failure analysis of advanced packaging (e.g. TSVs, etc)

TriLambda™-40: Specifications

Parameter	Specification
High Resolution Mode	
Resolution Voxel	40 nm resolution 13 nm voxel
Field of View Sample Size	18 µm FOV 15-25 µm sample size preferred
Large Field of View Mode	
Resolution Voxel	120 nm resolution 40 nm voxel
Field of View Sample Size	60 µm FOV 60-100 µm sample size preferred
Contrast Modes	
	Absorption and Phase Contrast
Source	
Target Material	Tri Energy (standard): Cr (5.4 keV), Fe (6.4 keV), and Cu (8.0 keV) Additional targets include: Rh (2.7 keV), Au (9.7 keV), others available on request
Power	100 W
X-ray Optics	
Condenser	3 sets of Sigray Twin Paraboloidal X-ray Optics matched to zone plates
Focusing Objective	Fresnel diffraction zone plate lens system
Phase Ring	Zernike phase shift ring
X-ray Detectors	
	High efficiency x-ray detector system, CCD 2048 x 2048 pixel
Footprint	
	2.3 x 1.3 x 1.5 meters (L x W x H) 2000 kg
Maximum Load	
	1 kg
Stage	
	High precision tomography stage with 12 x 10 x 12 mm travel XYZ



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