PROTO

METALJET X-RAY
SOURCES & SYSTEMS

Custom X-ray Systems for Complex Projects

YOUR TRUSTED PARTNER

FOR DESIGNING HIGH-END METALJET X-RAY SYSTEMS

While we're known for our off-the-shelf solutions, we also specialize in the design and creation of custom x-ray systems. Proto's team of experts has the skills and experience to develop a unique solution for even the most complex project. We are committed to providing excellent service throughout the brainstorming, design, and manufacturing stages, ensuring that you get a complete solution for your specific application. When your project is complete, our scientists will provide the training and support you need to maximize the impact of your system.

PHASE-CONTRAST IMAGING

MICRO-CT

HIGH-ENERGY DIFFRACTION MICROSCOPY

CRYSTALLOGRAPHY

SMALL-ANGLE X-RAY SCATTERING

POWERED WITH METALJET TECHNOLOGY

With higher power density than conventional x-ray sources, Excillum MetalJet sources are the world's brightest microfocus x-ray tubes. Boasting incredible speed and impressive performance, liquid-metal jet anodes provide superior spot quality for x-ray applications.

FEATURES AND BENEFITS

- High-power microfocus source
- Choice of x-ray spectrum
- Tunable spot size
- Highly stable source position
- Superior spot quality
- Optional dual port mode
- User-variable size and aspect ratio of spot
- Very stable x-ray emission and spot position
- Optional shutter
- Minimal and predictable maintenance
- LaB_6 long-life cathode

TECHNICAL SPECIFICATIONS

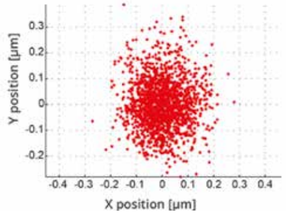
	MetalJet C2	MetalJet D2+70kV	MetalJet D2+160 kV	MetalJet E1 160 kV
Target material	ExAlloy G1	ExAlloy G1	ExAlloy I1, I2, I3	ExAlloy I1, I2, I3
Target type	Liquid jet			
Voltage	21-70 kV	21-70 kV	21-160 kV	21-160 kV
Power	0-200 W	0-250 W	0-250 W	0-700 W
Focal spot size	4x20 µm	5-30 µm	5-30 µm	5-30 µm
Emission stability	< 1%			
Position stability	< 1 µm			
Application	Low-cost, upgradable to a D2	Crystallography, SAXS	High-pressure crystallography, charge density mapping, SAXS	CT phase-contrast imaging, HEDM, SAXS

AVAILABLE ANODE ALLOYS

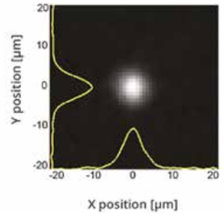
Anode Alloy	Gallium (weight %)	Indium (weight %)	Tin (weight %)
ExAlloy G1	95	5	–
ExAlloy I1	68	22	10
ExAlloy I2	47	37	16
ExAlloy I3	75	25	–

CHARACTERISTICS

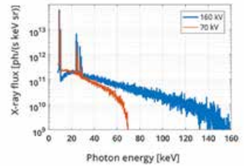
SPOT STABILITY OVER 24 HOURS



SPOT SHAPE EXAMPLE



EMISSION SPECTRA AT 250 W, 20 µm, ExAlloy I1



PERFORMANCE EXAMPLE (D2+160 KV)

Jet Material	Nominal X-ray Spot Size [µm]	E-Beam Power [W]	Ga Kα (9.2 keV) Peak Brightness [photons/(s mm^2 $mrad^2$)]	Ga Kα (9.2 keV) Radiant Flux [photons/(s $mrad^2$)]	In Kα (24 keV) Peak Brightness [photons/(s mm^2 $mrad^2$)]	In Kα (24 keV) Radiant Flux [photons/(s $mrad^2$)]
ExAlloy G1	20	250	2.9×10^{10}	1.3×10^{7}	5.9×10^{8}	2.9×10^{5}
ExAlloy I1	20	250	1.7×10^{10}	6.1×10^{6}	2.2×10^{9}	1.1×10^{6}

MODULAR PLATFORMS

FOR THE ULTIMATE EXPERIMENTAL FLEXIBILITY

MODULARITY

Modular cabinet designs allow for easy operation, convenient reconfiguration, and future expansion of your system.

DESIGN FLEXIBILTY

With our state-of-the-art facilities and experienced team of scientists, we work with you to provide creative solutions for complex applications.

MULTIPLE BEAM LINES

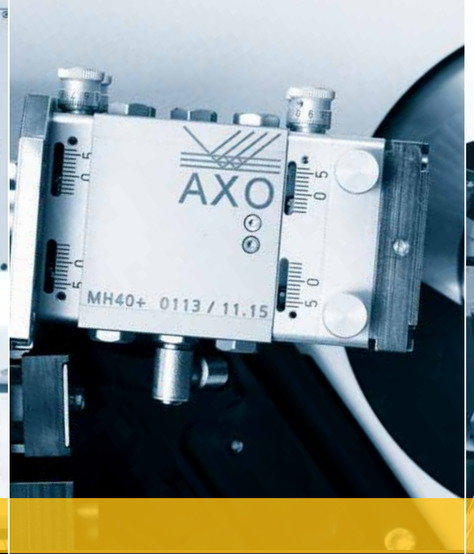
Using a secondary port on the MetalJet or a translating slide within the cabinet, you have the flexibility to set up more than one experimental beam line.

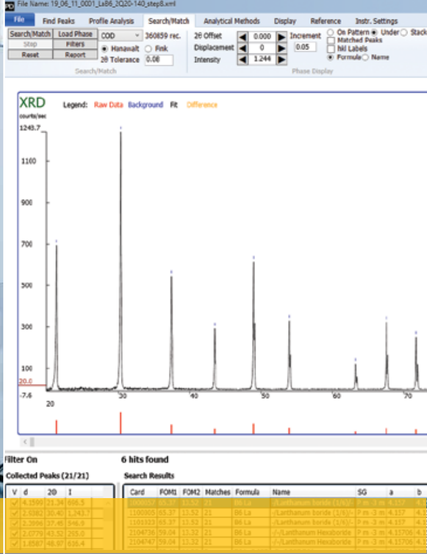
MULTIPLE STAGE OPTIONS

Optimize data collection with rotation stages and variable-length translation slides.

RADIATION PROTECTION

Innovative enclosures, convenient status lights and interlocks, and zero-emission radiation shields ensure user protection.





SOURCE

- Excillum MetalJet
- gallium or indium alloys
- 200 W, 250 W or 750 W

OPTICS

- multilayer optics (focusing or parallel beam)
- fully automated alignment

MOTION

- custom-length detector and sample translation slides
- sample rotation stages
- custom motion as required

DETECTORS

- Dectris PILATUS3 or EIGER photon-counting detectors
- silicon flat panels
- scintillation cameras

ENCLOSURE

- modular design
- shutters
- custom beam path lengths (up to 10 m)
- accommodation for experimental rigs such as tensile testers, rotation stages, etc.

SOFTWARE

- collection software
- full integration with all devices
- custom algorithm development

LONG-TERM
SUPPORT & RESOURCES

You want a system that is long lasting while still keeping up with your changing experimental needs. Proto is there for you every step of the way. Whether you're interested in an extended warranty or a training course for your workers, we will give you the tools to make the most out of your system. Our diverse team of scientists, engineers, and specialists is always ready to provide you with excellent, efficient service.

WARRANTY
STANDARD & EXTENDED

You can count on Proto's hassle-free component replacement to keep your instrument running flawlessly. Whether you're interested in a standard or specialized package, Proto offers a wide range of warranty options to suit your needs. Give yourself security and peace of mind by ensuring that your system is covered for as long as you choose.

ADAPTATIONS/
MODIFICATIONS

You want a system that will be useful for years to come, even if your experimental needs change along the way. Custom equipment can be a big investment, but don't worry – Proto's systems are built to accommodate the ever-advancing nature of science. As your experimental requirements shift, your system can adapt at your convenience so your research remains at the height of innovation.

MAINTENANCE
PACKAGES

Ensure that your system is always running optimally with one of our comprehensive maintenance packages. From the MetalJet source to the cooling system to the safety interlocks, Proto's expert team is ready to perform any maintenance you might need. If you'd prefer to do the work yourself, we can also train your technicians in our maintenance techniques so that your machine is always performing its best.

TRAINING
ON- OR OFF-SITE

Proto's expert trainers can work with users of any experience level. Our goal is to help customers become informed and confident using their equipment, giving them the skills to optimize experimental conditions. We offer flexible and convenient training options, including both on- and off-site training courses.

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