

XR401: High Sensitivity sCMOS Camera for TEM

- **4.0 Megapixel Scientific CMOS**
- **100 Frames/Second Readout**
- **70% Efficiency, Non-Blooming Sensor**
- **AMT's Proven, High Performance B-Lens**
- **Peltier cooled**



The XR401 features a cooled sCMOS sensor that simultaneously achieves high resolution and fast readout speeds. The sCMOS breakthrough in signal-to-noise means low dose imaging – once only available with expensive, slow scan cameras - is now possible with this fast and affordable camera. Non-blooming sCMOS sensors are more suitable for diffraction than anti-blooming CCD sensors that have ~100:1 blooming suppression. This sensor is combined with AMT's high throughput optics to achieve high levels of speed, sensitivity, and dynamic range for normal imaging, low dose imaging, cryo-TEM, and diffraction. Lens coupling eliminates lifetime limitations from defect generation and displacement damage that occur in direct electron exposure systems using more conventional CMOS architectures.



AMT's lens combines extraordinary speed with high resolution. This lens maintains both high MTF and high numerical aperture (NA) to provide unmatched sharpness and extremely high sensitivity. This lens also has negligible distortion across the entire field and maintains focus at all corners.

AMT's advanced phosphor and substrate technologies produce brighter images with less structured noise than competing phosphors, while resisting beam damage. Note that reducing structured noise improves both aesthetics and quantitative data quality.

AMT's software is also well regarded for its efficiency and ease-of-use, which help make AMT's systems productivity enhancers.

Standard XR401 Camera Configurations

XR401S-B Classic Wide Angle Side Mount	XR401M-B Multi-Discipline Mid-Mount
XR401L-B High Magnification Low Mount	XR401CH-B Spectrometer compatible

1) All configurations use AMT's high performance B-lens with large 0.013 mm pixels with a 26 mm square phosphor.

2) Max guaranteed display rate 100 fps @ 2x2 binning with Camera Link interface.

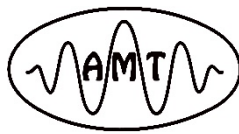
3) Single electron detection SNR of 15:1 at 120kV. Phosphors are customized for TEM accelerating voltages.

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XR401 Specifications	
Sensor Size [pixels]	2048x2048
Phosphor Pixel Size [μm]	13 x 13
Active Pickup Region [mm]	27 x 27
Digitization	16 bits native, >16 bits with integration
Mounting Position	Side Mount "35mm" or On-Axis
HT Range [kV]	20–200
Optical Coupling	Custom high performance lens
Lens Magnification	0.5
Lens NA _{image}	0.22
Lens MTF at Nyquist [%]	>60
Framerate for Display Image [fps]	100
Cooling	Water or Air
Micro Lenses	Yes
Shutter	Rolling
Exposure Time [ms]	1 - 10,000
Power	100-240VAC
Digital Interface	USB3 or Camera Link
Vacuum Compatibility	<10 ⁻⁷ torr
Vacuum Seals	Fixed o-ring
Environment	Electronics and cooling outside of vacuum
X-ray shielding limit	Up to 200kV
Certifications	UL, CE, RoHS
Computer OS	Windows 10 Professional 64 bits

Specifications subject to change without notice*

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