Princeton Instruments

SPECTROSCOPY GROUP

SPEC-10: 2K

2048 x 512

The Spec-10: 2K series of cameras from Princeton Instruments is designed with extremely low noise electronics for quantitative scientific spectroscopy applications. Choose back-illuminated (B/BUV) or eXcelon™ versions of the 2048 x 512 CCD for optimized performance from UV to NIR. Spec-10 cameras provide software-selectable gains that permit operation in either high-capacity mode (absorbance spectroscopy) or high-sensitivity mode (Raman or fluorescence spectroscopy), delivering sensitivity and dynamic range unmatched by industry-standard 1024 pixel CCDs. Cooling the CCD to cryogenic temperatures effectively eliminates dark noise and provides the highest possible signal to noise ratio, even at low light levels. Princeton Instruments' exclusive eXcelon technology delivers the highest sensitivity in the NIR while suppressing etaloning that occurs in standard back-illuminated CCDs.

FEATURE	BENEFITS
Back-illuminated, eXcelon™ technology (B_eXcelon)	Highest QE in the visible with low dark current; Extremely low etaloning
2048 x 512 imaging array, 13.5 µm x 13.5 µm pixel	Provides highest level of resolution for demanding applications; Small pixel size supports high resolution
Back-illuminated CCD with single fused silica vacuum window	High quantum efficiency for low-light applications; Optional AR coating and wedge windows are available.
Cryogenic cooling	Effective elimination of dark noise, even for long exposure times
Software-selectable amplifiers	Exclusive feature provides highest level of sensitivity and dynamic range for absorbance, Raman, and fluorescence applications
Standard spectrometer interface	Easily interfaces with Acton Series and many other spectrometers
Dual-digitizer option	Multiple-speed digitization allows complete freedom to select between slow operation for low noise and highest SNR (signal-to-noise ratio) or fast operation for rapid image acquisition
USB 2.0 interface	Plug-and-play operation with PC notebooks, laptops and desktops; Easy OEM integration
PCI interface configuration	Industry standard for fast, reliable data transfer
WinSpec (for Windows XP/7; 32-bit) and PVCAM®	Offers easy yet sophisticated Windows® GUI controls; Powerful, yet easy to use software packages for automated data acquisition, display and analysis; Universal programming interface for easy custom programming
Linux® drivers and SITK™ plug-in for National Instruments' LabVIEW™	Extends system utility

Applications:
Raman, Absorbance and
Fluorescence spectroscopy

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SPECIFICATIONS

	SPEC-10: 2KB eXcelon	SPEC-10: 2KB/2KBUV
Features	Back-illuminated CCD with eXcelon technology. Enhanced sensitivity in the UV and the NIR. Low levels of etaloning with 100x less dark charge than deep depletion sensors.	UV-AR-coated, back-illuminated CCD. Special BUV version offers the highest sensivity in the UV region.
CCD Image Sensor	Princeton Instruments' proprietary CCD technology, grade 1, AIMO	e2v CCD42-10, industry standard, back-illuminated, grade 1, AIMO
CCD format	2048 x 512 imaging pixels; 13.5 x 13.5-µm pixels with 100% fill factor	
Imaging area	27.6 x 6.9-mm (optically centered)	
Dark current @ -120°C (e-/p/hr)	0.3 (Typical)	
System read noise @100 kHz @1 MHz @2 MHz	 3.5 e- rms (Typical) 5 e- rms (Maximum) 8 e- rms (Typical) 10 e- rms (Maximum) 13 e- rms (Typical) 18 e- rms (Maximum)	
Vertical shift rate (software adjustable)	15.2 µsec/row	
Spectrometric well capacity High Sensitivity High Capacity	 150 ke- (Minimum) 250 ke- (Typical) 600 ke- (Minimum) 800 ke- (Typical)	
Deepest cooling temperature	-120°C (Minimum) -110°C (Typical)	
Thermostating precision	±0.05°C across entire temperature range	
Software selectable gains High Sensitivity High Capacity	HIGH MID LOW 1.5 e-/ct 3 e-/ct 6 e-/ct 6 e-/ct 12 e-/ct 24 e-/ct	
Dynamic range	16 Bits	
Nonlinearity @100 kHz readout @1 MHz readout @2 MHz readout	 <1% <2% <2%	
Dimensions / Weight	16.59 cm (6.53") x 11.81 cm (4.65") x 11.38 cm (4.48") (L x W x H) / 2.27 kg (5lb)	

All specifications are subject to change.

SPECTRAL RATE

@ 100 kHz Full Vertical Binning (FVB)	35 spectra/sec
@ 1 MHz Full Vertical Binning (FVB)	60 spectra/sec
@ 2 MHz Full Vertical Binning (FVB)	90 spectra/sec

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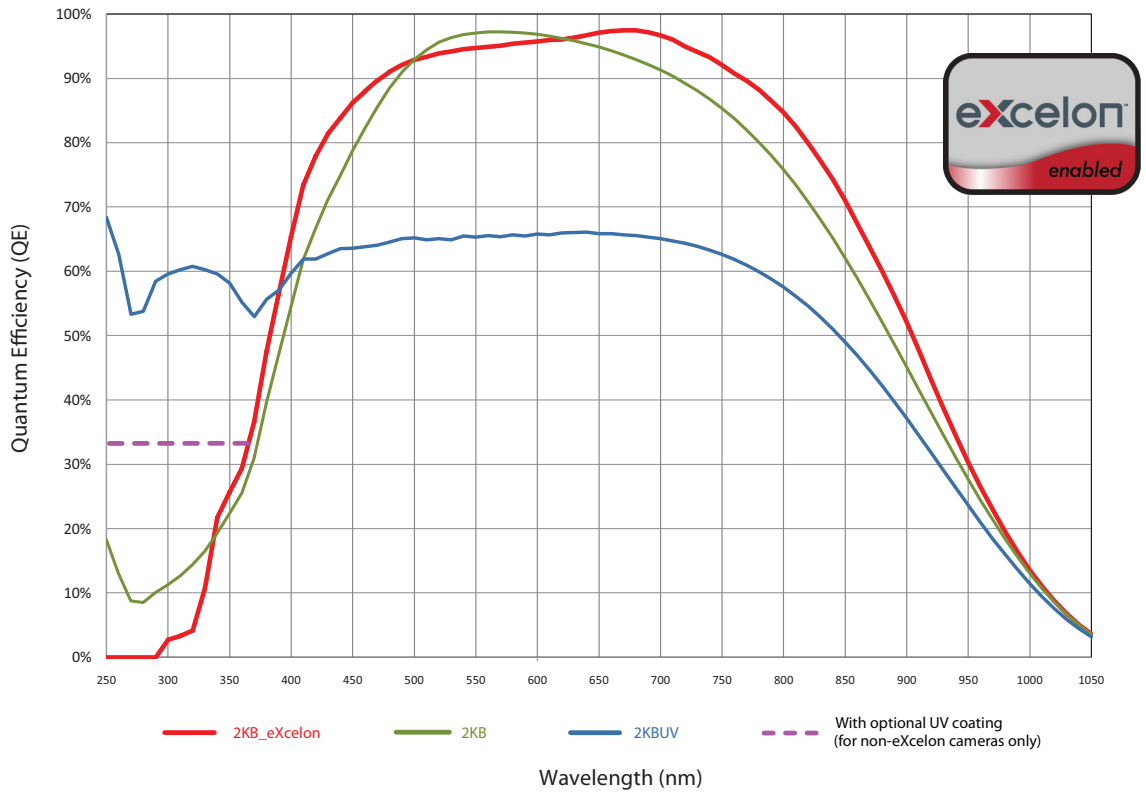
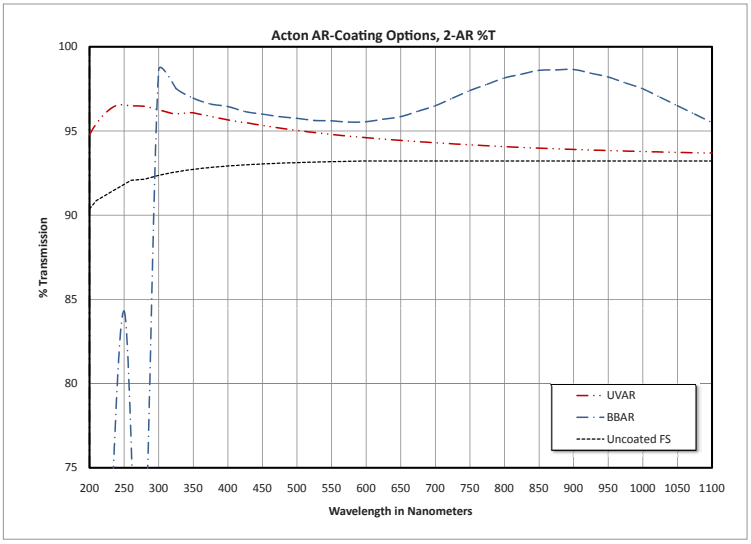
QE DATA



NOTE:
Graph shows typical Quantum Efficiency (QE) data measured at + 25°C. QE decreases at normal operating temperatures. For the best results for your application, please discuss the specific parameters of your experiment with your sales representative.

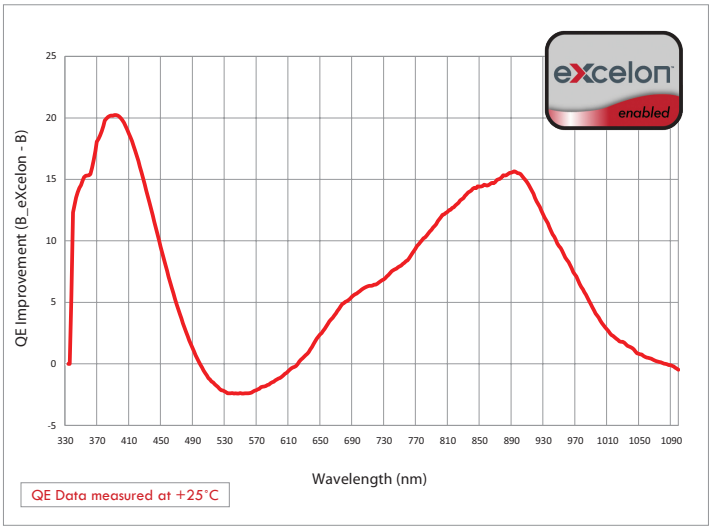
ANTI REFLECTION COATINGS



NOTE:
Standard anti-reflection (AR) coatings shown. Custom AR coatings and wedge window options are also available. Contact your local sales representative for more information.

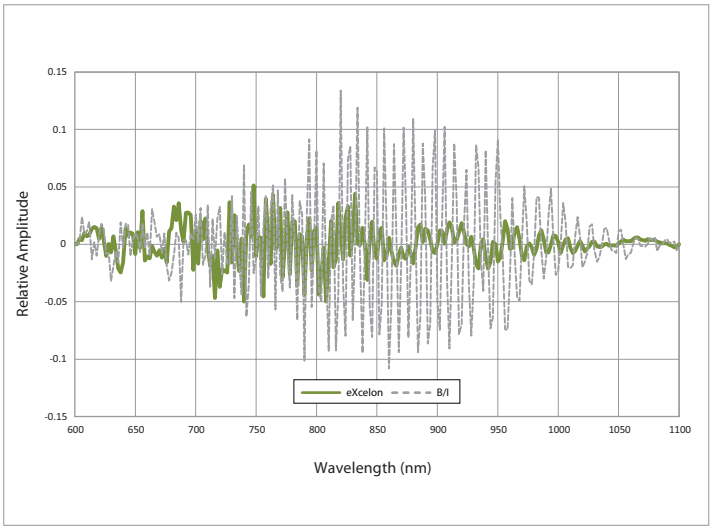
eXcelon Performance

QE Improvement (B_eXcelon vs. B)

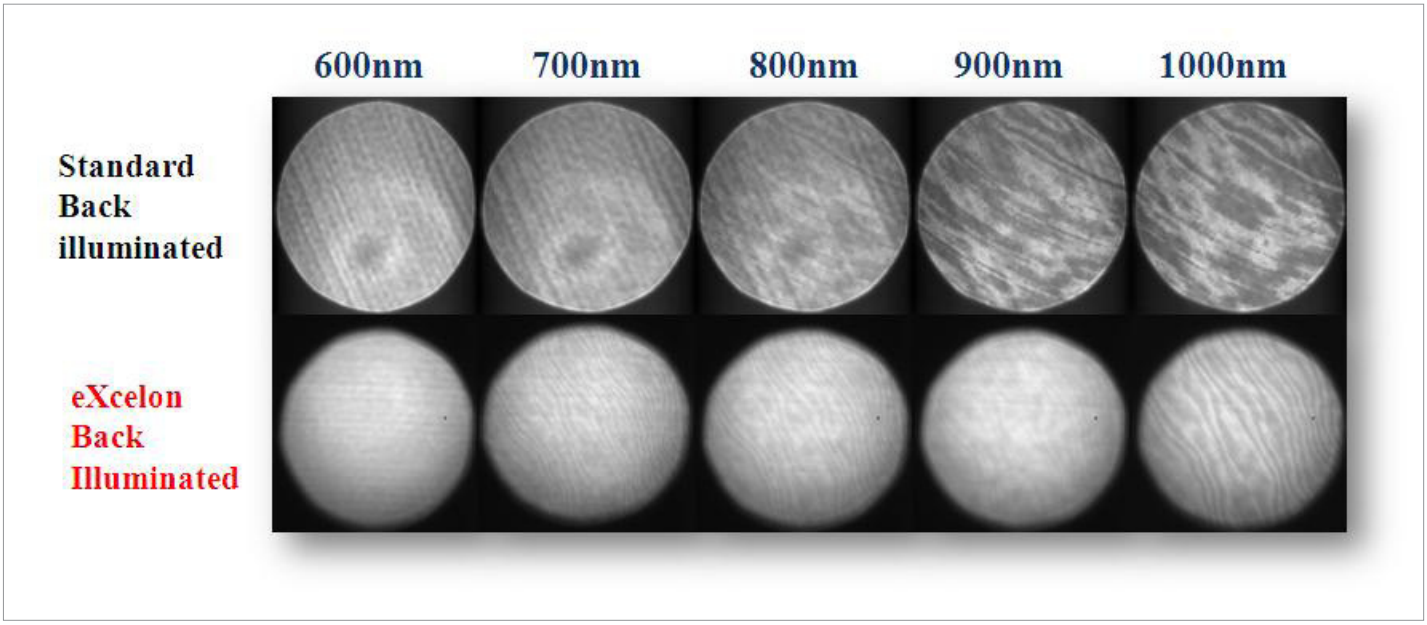


B_eXcelon provides superior QE over the standard back illuminated ("B") version in the UV-NIR range.

Etalon Oscillations (B_eXcelon vs. B)



B_eXcelon provides significantly lower etaloning (unwanted fringes) compared to standard back illuminated ("B") version.



Data taken with white light source through a monochromator, comparing etaloning performance of eXcelon vs. back-illuminated CCDs.

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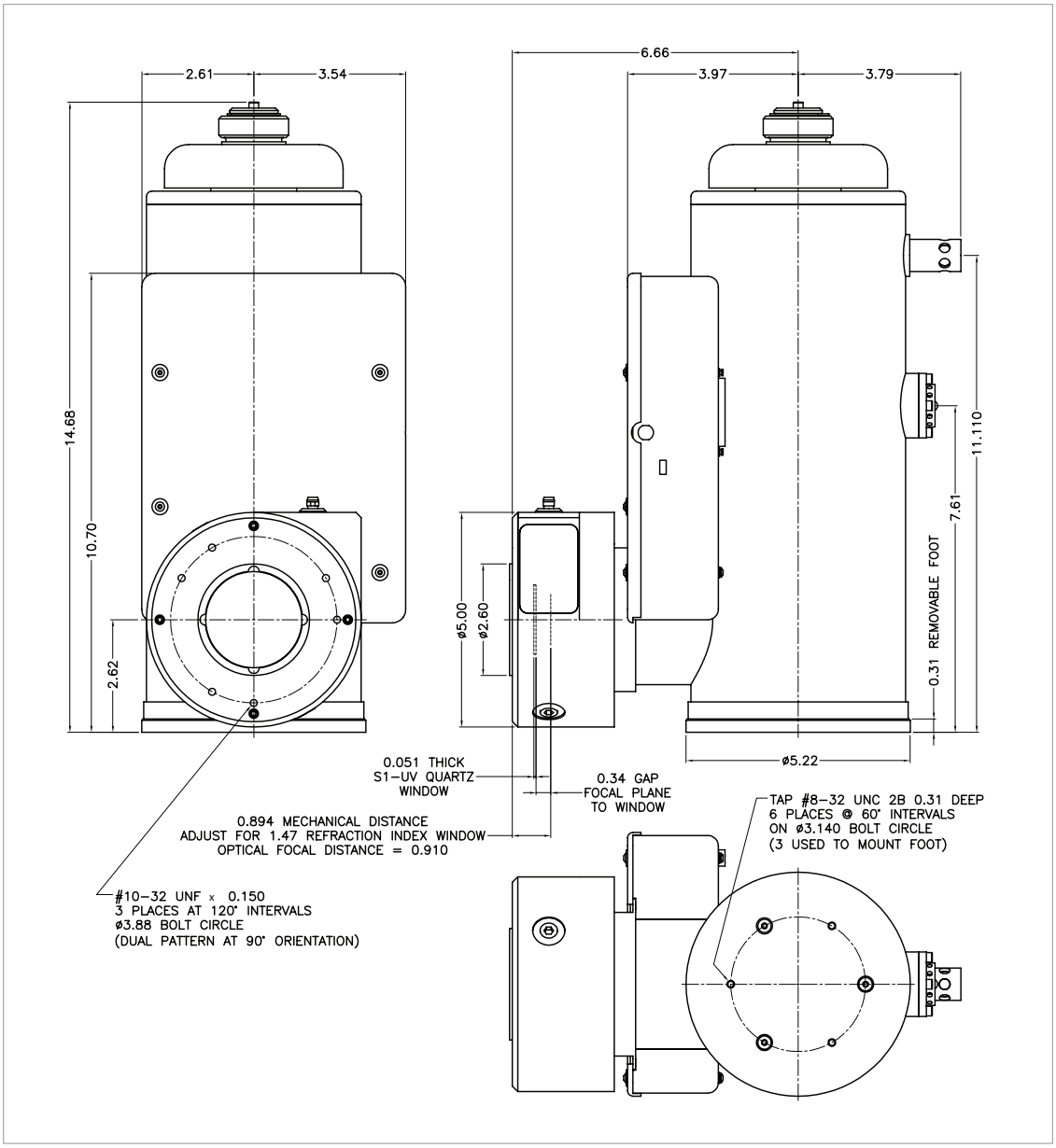
SPEC-10: 2K WITH SHUTTER



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