TELEDYNE
PRINCETON INSTRUMENTS
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Part of the Teledyne Imaging Group

PyLoN:2K
2048 x 512

The PyLoN®:2K is a controllerless, cryogenically-cooled CCD camera designed for quantitative scientific spectroscopy applications demanding the highest possible sensitivity. Princeton Instruments has completely redesigned the industry-leading Spec-10 family of cameras to eliminate the external controller, increasing experimental flexibility while further improving the ultralow noise electronics. Liquid nitrogen cooling virtually eliminates dark current, while PyLoN's indium metal seals enhance its vacuum longevity. PyLoN cameras are fully supported by LightField®, powerful 64-bit data acquisition software, and IntelliCal® wavelength and intensity calibration packages. PyLoN features ADC rates of up to 4 MHz, with digital bias stabilization and correlated double sampling for decreased read noise and improved linearity, and Princeton Instruments' exclusive eXcelon® technology, delivering the highest responsivity from the UV to the NIR while suppressing etaloning that occurs in standard back-illuminated CCDs.

FEATURE	BENEFITS
eXcelon technology	Increases detector sensitivity while suppressing etalon interference fringes observed in the NIR with conventional back-illuminated devices.
2048 x 512 imaging array, 13.5 µm x 13.5 µm pixels	Increases spectral resolution when used with aberration-free imaging spectrographs like the IsoPlane SCT 320 from Princeton Instruments.
Cryogenic cooling to -120°C using liquid nitrogen	Effectively eliminates dark charge, permitting acquisition times from milliseconds to hours.
Single fused silica vacuum window	Minimizes reflection losses from UV-IR; Optional AR coatings & wedge windows are available.
Optional UV phosphor coatings	Extends CCD sensitivity to below 200 nm.
TTL input and output	Allows external control of and triggering by lasers or timing generators.
Single amplifier with dual readout modes and software-selectable system gains	High sensitivity mode reduces read noise floor for weak signals; High capacity mode increases dynamic range.
Kinetics & Custom Sensor modes	Standard on all PyLoN cameras, Kinetics mode allows microsecond-resolved kinetic spectral acquisition, while Custom Sensor mode increases control over the camera readout, permitting spectral rates of over 1000 fps.
Data acquisition rates of 50 kHz to 4 MHz	Up to 4X as fast as its predecessor - Choose low speed digitization to reduce noise, or high speed for rapid spectral acquisition.
Optional end-on and all-directional dewar mounts	Allows for easy and flexible camera positioning.
GigE data interface	Reliable data transmission over 50 m for remote operation.
Optional: LightField® (for Windows 8/7, 64-bit) Or WinView/Spec (for Windows 8/7/XP, 32-bit)	Flexible software packages for data acquisition, display and analysis; LightField offers intuitive, cutting edge user interface, IntelliCal® and more.
PICAM (64-bit) / PVCAM (32-bit) software development kits (SDKs)	Compatible with Windows 8/7/XP, and Linux; Universal programming interfaces for easy custom programming.

Applications:
Raman Spectroscopy, Absorbance, Emission, Fluorescence and Reflectance Spectroscopy

SPECIFICATIONS

	PyLoN:2KB_eXcelon	PyLoN:2KB/BUV	PyLoN:2KF
Features	Back-illuminated CCD with eXcelon technology. Enhanced sensitivity in the UV and the NIR with low etaloning.	Back-illuminated CCD. High sensitivity in both the visible and UV. Special BUV version offers the highest sensitivity in the UV. Subject to etaloning in the NIR.	Front-illuminated CCD. Affordable technology for moderate light level applications. No etaloning.
Typical dark current	0.1* e^-/pixel/hour @ -120°C		
Typical system read noise @ 50 kHz @ 1 MHz	 3.5 e^- rms (single pixel), 8 e^- rms (FVB) 8 e^- rms (single pixel)		
Operating temperature	-80°C to -120°C with ±0.05°C thermostating precision		
CCD format	2048 x 512, 13.5 µm x 13.5 µm pixels with 100% fill factor		
Imaging area	27.6 x 6.9 mm (optically centered)		
Spectrometric well capacity: High Sensitivity High Capacity	 > 250 ke^- > 800 ke^-		
ADC rates	50, 100, 200, 500 kHz and 1, 2, 4 MHz; 16 bits		
Non-linearity	< 1% @ 100 kHz		
Vertical shift times	8 - 20 µsec/row (programmable)		
Analog gain (typical)	1, 2, 4 e^-/ADU (high sensitivity); 3, 6, 12 e^-/ADU (high capacity)		
Data interface	Gigabit Ethernet		
I/O signals	Trigger In, TTL Out, Readout Monitor, Expose Monitor, Shutter Monitor		
Optical mount	Princeton Instruments Acton spectrometer adapter with optional 40 mm shutter		
Operating environment	+5°C to +30°C, non-condensing atmosphere		
Certification	CE		
Dimensions Weight	14.6 inches (371 mm) x 8.2 inches (208 mm) x 10.5 inches (267 mm) (H x W x D) Approximately 10 lbs (4.5 kg)		

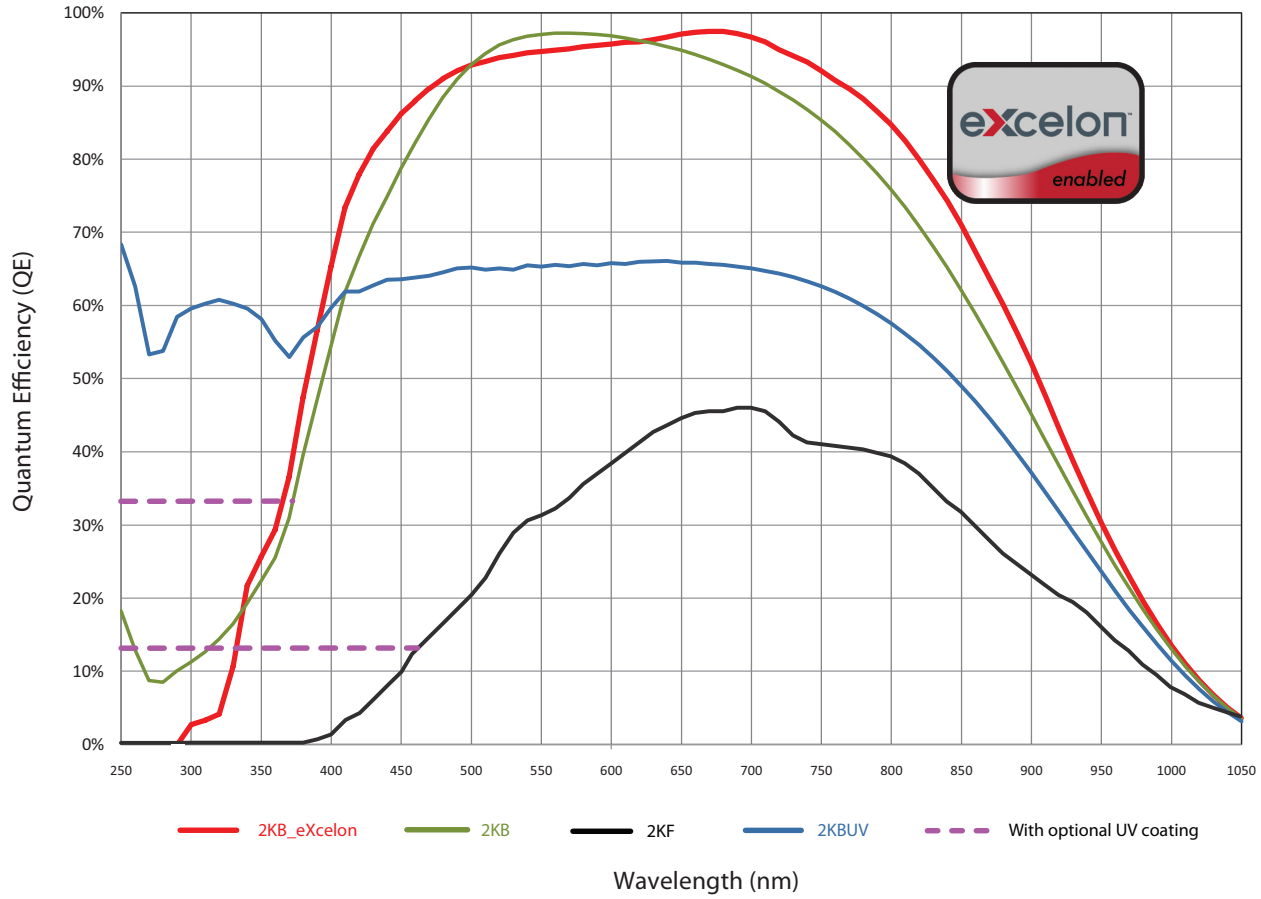
* Limited by cosmic ray background

All specifications are subject to change.

SPECTRAL RATES

@ 4 MHz Full Frame	3.2 fps
@ 4 MHz Full Vertical Bin	170 fps
@ 4 MHz, 20 rows (0.37 mm high) Custom Chip	1280 fps

QE DATA

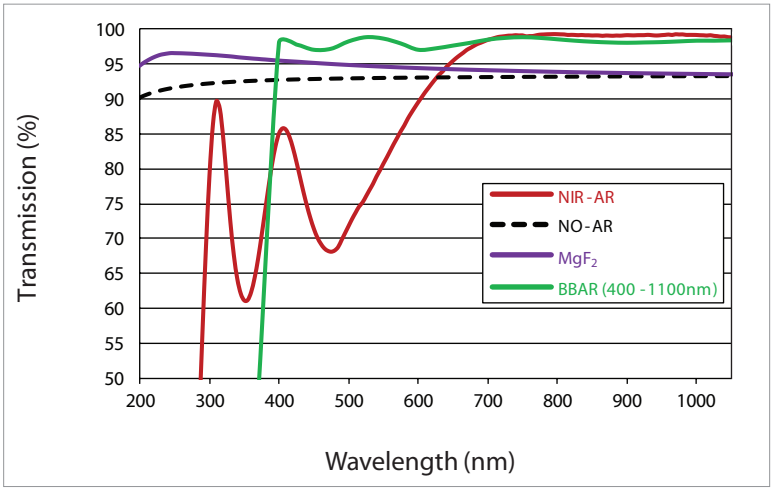


NOTE:
Graph shows typical Quantum Efficiency (QE) data measured at + 25°C. QE decreases at normal operating temperatures. For the best results for your application, please discuss the specific parameters of your experiment with your sales representative.

VACUUM WINDOW AR COATINGS

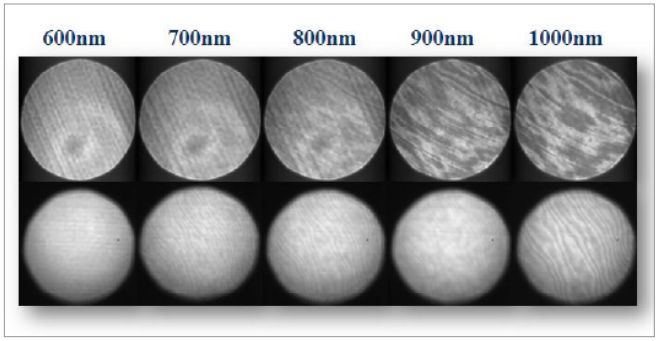
NOTES:
- Standard anti-reflection (AR) coating options shown on graph
- Designed by Acton Optics, our BBAR coating offers unmatched performance for 400 nm - 1100 nm
- Custom wedge window options and other AR coatings are also available

Contact your local sales representative for more information

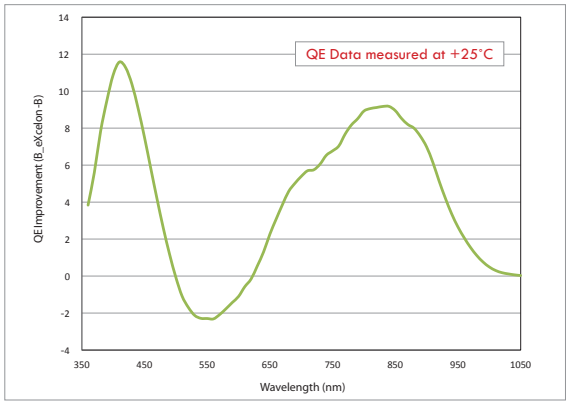


eXcelon Performance

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

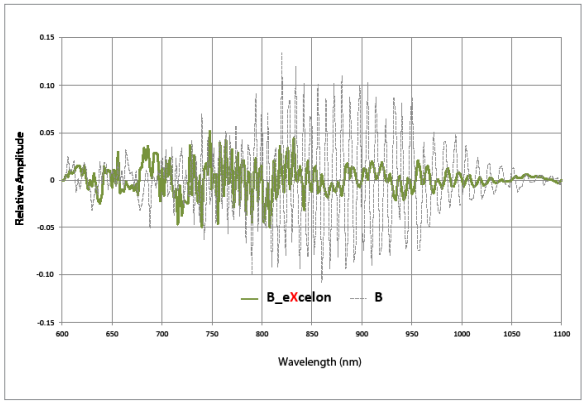


QE Improvement (B_eXcelon vs. B)



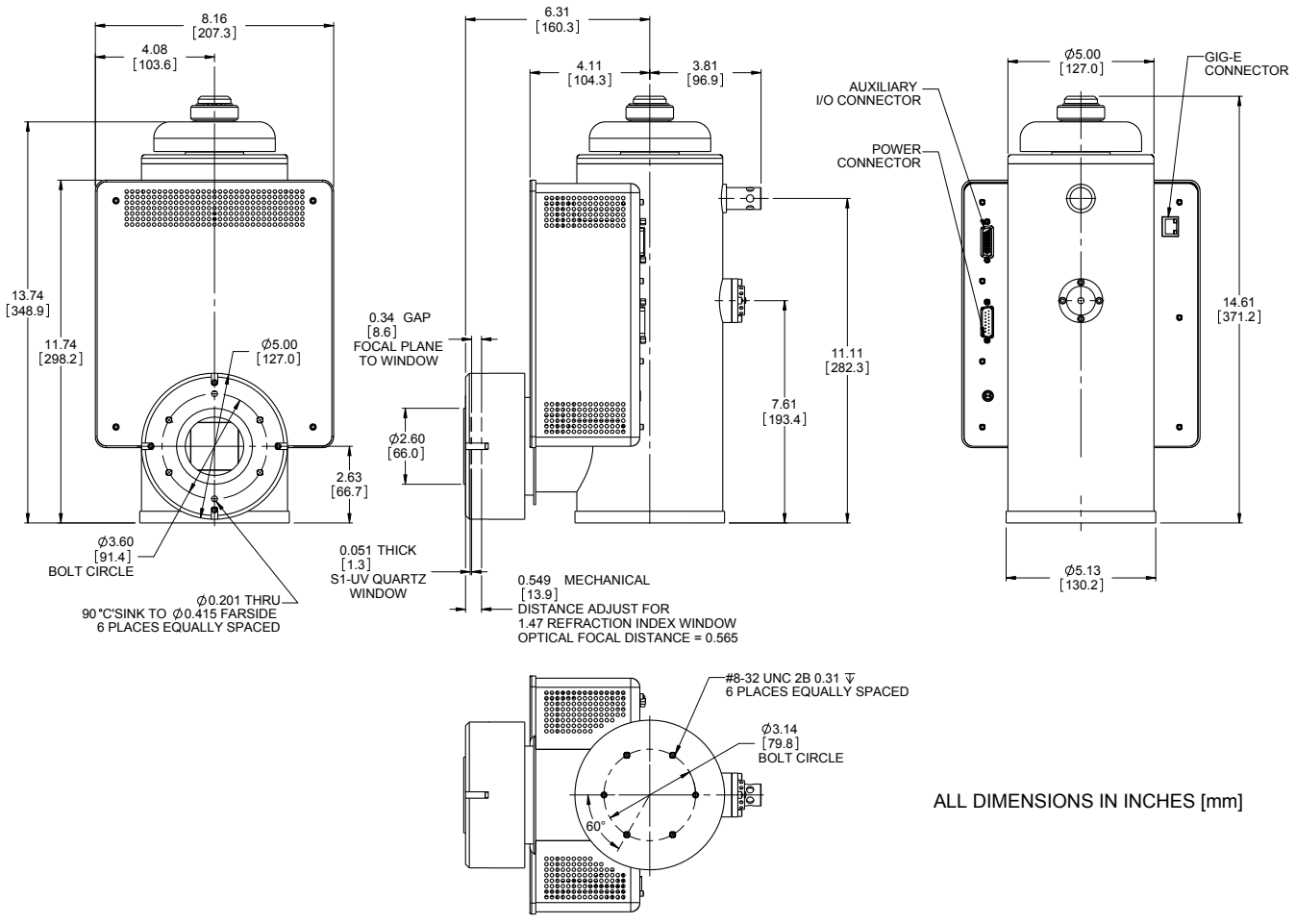
B_eXcelon provides superior QE over the standard back illuminated ("B") version in the UV-NIR range.

Etalon Oscillations (B_eXcelon vs. B)



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

PyLoN without shutter



PyLoN with 40 mm shutter