The PIXIS: 1024 series of cameras from Princeton Instruments (PI) are fully integrated, low noise cameras with 1024 x 1024 resolution designed for quantitative scientific imaging applications from UV to NIR. Based on PI’s exclusive XP cooling technology, PIXIS are the only cameras that offer cooling down to -90°C, with an all-metal, hermetically sealed design and the industry’s only lifetime vacuum guarantee. High QE and ultra low-noise electronics make the PIXIS: 1024 series of cameras ideal for demanding, low light applications such as astronomy, Bose-Einstein Condensate (BEC), solar cell inspection, chemiluminescence and fluorescence imaging. The exclusive B_eXcelon® and BR_eXcelon technologies of the PIXIS:1024 deliver the highest sensitivity in the UV-NIR range while suppressing the etaloning that occurs in standard back illuminated CCDs. Dual speed operation at 100kHz or 2MHz enables these cameras to be used both for steady state as well as fast kinetics studies.

**FEATURE**

- Back-illuminated, deep depletion CCD with eXcelon® technology (BR_eXcelon)
- Back-illuminated, eXcelon® technology (B_eXcelon)
- 1024 x 1024 imaging array, 13 μm x 13 μm pixels
- Scientific grade CCD
- All-metal, hermetic vacuum seals; Lifetime vacuum guarantee
- Deep cooling
- Single fused silica vacuum window
- Optional UV phosphor coatings
- TTL input and output, and shutter control
- Low noise electronics
- Dual digitizers
- Software selectable system gains
- Kinetics
- USB2.0 data interface
- Optional: LightField® (for Windows 8/7, 64-bit) Or WinView/Spec (for Windows 8/7/XP, 32-bit)
- PICAM (64-bit) / PVCAM (32-bit) software development kits (SDKs)

**BENEFITS**

- Highest QE in the UV and NIR range; High QE in the NIR range; Eliminates etaloning.
- Lower dark charge than back-illuminated deep depletion CCDs; Extremely low etaloning.
- High spatial resolution. Low noise, few defects, linear response.
- No out-gassing (as in epoxy seals) which can compromise vacuum performance; Worry free operation.
- Low dark noise allows detection of faint signals; CoolCUBE II, a compact room temperature coolant circulator, is available for vibration sensitive environments.
- Minimizes reflection losses from UV to IR; No optical losses due to multiple optical surfaces; Optional AR coating and wedge windows available.
- Enhances sensitivity throughout the UV to below 200 nm.
- External control and triggering.
- Best performance for low light level applications.
- Dual-speed digitization allows complete freedom to select between “slow operation” for low noise and highest SNR or “fast operation” for rapid image acquisition.
- Flexibility to optimize signal-to-noise ratio and dynamic range.
- Custom readout mode offers microsecond resolution.
- Plug-and-play operation with desktops or laptops; Optional fiber optic interface for remote operation.
- Flexible software packages for data acquisition, display and analysis; LightField offers intuitive, cutting edge user interface, IntelliCal® and more.
- Compatible with Windows 8/7/XP, and Linux; Universal programming interfaces for easy custom programming.

**Applications:**

Astronomy, Photometry, EL/PL Imaging, Luminescence & Fluorescence Imaging, and Bose-Einstein Condensate (BEC)
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>PIXIS: 1024BR_eXcelon</th>
<th>PIXIS: 1024BR</th>
<th>PIXIS: 1024B_eXcelon</th>
<th>PIXIS: 1024B/BUV</th>
<th>PIXIS: 1024F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>Back-illuminated, deep depletion CCD with eXcelon technology. Highest QE in the UV and the NIR. No etaloning.</td>
<td>Back-illuminated, deep depletion CCD. High QE in the NIR and no etaloning.</td>
<td>Back-illuminated CCD with eXcelon technology. Highest QE in the visible and high QE in the NIR. Extremely low etaloning. 5x - 100x lower dark charge than the BR.</td>
<td>Back-illuminated CCD. Highest sensitivity in the visible region. Special BUV version offers the highest sensitivity in the UV region.</td>
<td>Front-illuminated CCD. Affordable technology for moderate light level applications. No etaloning.</td>
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<tr>
<td><strong>CCD Image Sensor</strong></td>
<td>Princeton Instruments' proprietary CCD with eXcelon technology, grade 1, NIMO</td>
<td>e2v CCD47-10 back-illuminated deep depletion, grade 1, NIMO</td>
<td>Princeton Instruments' proprietary CCD with eXcelon technology, grade 1, AIMO</td>
<td>e2v CCD47-10 back-illuminated, grade 1, AIMO</td>
<td>e2v CCD47-10 front-illuminated, grade 1, AIMO</td>
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<tr>
<td>Dark current @ -70°C (e-/p/sec)</td>
<td>0.02 (typical), 0.07 (max)</td>
<td>0.02 (typical), 0.07 (max)</td>
<td>0.0004 (typical), 0.001 (max)</td>
<td>0.0004 (typical), 0.001 (max)</td>
<td>0.0002 (typical), 0.0007 (max)</td>
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<tr>
<td><strong>CCD UV coating</strong></td>
<td>Optional UV coating (not needed for BUV version)</td>
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<tr>
<td><strong>CCD format</strong></td>
<td>1024 x 1024 imaging pixels; 13 x 13 μm pixels; 100% fill factor</td>
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<tr>
<td>Imaging area</td>
<td>13.3 x 13.3 mm (optically centered)</td>
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<tr>
<td><strong>Lens mount</strong></td>
<td>Adjustable C-mount with integral 25mm shutter; spectrometer adapter available</td>
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<tr>
<td><strong>Deepest cooling temperature</strong></td>
<td>-90°C typical; -70°C guaranteed, specified at ambient temperature of +20°C</td>
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<tr>
<td><strong>Thermostating precision</strong></td>
<td>±0.05°C</td>
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<tr>
<td><strong>Cooling method</strong></td>
<td>Thermoelectric air or liquid cooling (CoolCUBE II liquid circulator available)</td>
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<tr>
<td><strong>Full well</strong></td>
<td>Single pixel 100 ke- (typical), 60 ke- (min)</td>
<td>250 ke- (typical), 220 ke- (min)</td>
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<td><strong>Output node</strong></td>
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<tr>
<td><strong>ADC speed/bits</strong></td>
<td>100kHz/16-bit and 2MHz/16-bit</td>
<td>3.0 e- rms (typical), 5 e- rms (max)</td>
<td>9.0 e- rms (typical), 15 e- rms (max)</td>
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<tr>
<td><strong>System read noise @ 100 kHz</strong></td>
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<tr>
<td><strong>System read noise @ 2 MHz</strong></td>
<td></td>
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<tr>
<td><strong>Vertical shift speed</strong></td>
<td>&lt; 3.2 μsec/row to 18 μsec/row (programmable)</td>
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<tr>
<td><strong>Non-linearity</strong></td>
<td>&lt;1% @ 100 kHz</td>
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<tr>
<td><strong>Software selectable gains</strong></td>
<td>1, 2, 4 e-/ADU (typical); available at all speeds</td>
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<tr>
<td><strong>Operating systems supported</strong></td>
<td>Windows 8/7 (64-bit) and Linux (64-bit), Windows 8/7/XP (32-bit)</td>
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<tr>
<td><strong>Data interface</strong></td>
<td>USB2.0 (5m interface cable provided); Optional Fiberoptic interface is available for remote operation</td>
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<tr>
<td><strong>I/O signals</strong></td>
<td>Two MCX connectors for programmable frame readout, shutter, trigger in</td>
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<tr>
<td><strong>Operating environment</strong></td>
<td>+5 to +30°C non-condensing</td>
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<tr>
<td><strong>Certification</strong></td>
<td>CE</td>
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<tr>
<td><strong>Dimensions / Weight</strong></td>
<td>16.59 cm (6.53&quot;) x 11.81 cm (4.65&quot;) x 11.38 cm (4.48&quot;) (L x W x H) / 2.27 kg (5 lbs)</td>
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</tbody>
</table>

All specifications subject to change

## FRAME RATE

<table>
<thead>
<tr>
<th>Binning</th>
<th>Readout Time @ 2 MHz</th>
<th>Readout Time @ 100 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 1</td>
<td>0.58 sec</td>
<td>10.0 sec</td>
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<tr>
<td>2 x 2</td>
<td>0.28 sec</td>
<td>2.8 sec</td>
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<tr>
<td>8 x 8</td>
<td>0.14 sec</td>
<td>0.85 sec</td>
</tr>
</tbody>
</table>

Readout Time

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**PIXIS: 1024 eXcelon Rev. N3.1**
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.
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

VACUUM WINDOW AR COATINGS

### eXcelon Performance

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

**QE Improvement (BR_eXcelon vs. BR)**

BR_eXcelon provides superior QE over standard back deep depletion ("BR") version over most of the UV-NIR range.

**Etalon Oscillations (BR_eXcelon vs. BR)**

BR_eXcelon provides significantly lower etaloning (unwanted fringes) compared to standard back deep depletion ("BR") version.

*NOTE: QE data @ +25°C*
PIXIS: 1024 (AIR COOLED)

NOTES:
1. WEIGHT: 5 lbs / 2.27 kg
2. POWER DISSIPATION 80 WATTS AT FULL POWER.
3. AIRFLOW 24 CFM FAN CAPACITY AT FULL POWER.
4. INTERNAL 25MM SHUTTER.
5. M6 THREADED INSERT AVAILABLE FOR CAMERA MOUNTING
6. WINDOW THICKNESS .125" [3.17mm]
NOTES:
1. WEIGHT 5.5 lbs / 2.5 kg
2. POWER DISSIPATION 110 WATTS AT FULL POWER
3. INTERNAL 25MM SHUTTER OPTIONAL
4. EXTERNAL WATER CIRCULATOR COOL CUBE S-7567-002