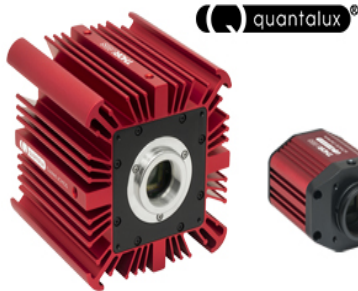


## SCIENTIFIC CAMERA SELECTION GUIDE

- ▶ Zelux<sup>®</sup> CMOS, Kiralux<sup>®</sup> CMOS, and Quantalux<sup>®</sup> sCMOS Scientific Cameras
- ▶ Models for Low Light, High Speed, UV, Visible, Near-IR, or Polarization
- ▶ Versatile ThorCam<sup>™</sup> Software with SDK and Programming Interfaces
- ▶ Support for C, C++, C#, .NET, Python, LabVIEW, MATLAB, and  $\mu$ Manager



Hermetically Sealed, TE-Cooled  
Monochrome sCMOS Camera



Passively Cooled, Compact  
Monochrome sCMOS Camera



CMOS Sensor Cameras  
with Low Read Noise



Polarization-Sensitive CMOS  
Sensor Camera

Ultra-Compact CMOS  
with Low Read

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Thorlabs offers three families of scientific cameras: Zelux<sup>®</sup>, Kiralux<sup>®</sup>, and Quantalux<sup>®</sup>. Zelux cameras are designed for general-purpose imaging and provide high imaging performance while maintaining a small footprint. Kiralux cameras have CMOS sensors in monochrome, color, NIR-enhanced, or polarization-sensitive versions and are available in compact, passively cooled housings; the CC505MU camera incorporates a hermetically sealed, TE-cooled housing. The polarization-sensitive Kiralux camera incorporates an integrated micropolarizer array that, when used with our ThorCam™ software package, captures images that illustrate degree of linear polarization, azimuth, and intensity at the pixel level. Our Quantalux monochrome sCMOS cameras feature high dynamic range combined with extremely low read noise for low-light applications. They are available in either a compact, passively cooled housing or a hermetically sealed, TE-cooled housing. The tables below provide a summary of our camera offerings.

Compact Scientific Cameras							
Camera Type	Zelux <sup>®</sup> CMOS	Kiralux <sup>®</sup> CMOS					Quantalux <sup>®</sup> sCMOS
	1.6 MP	1.3 MP	2.3 MP	5 MP	8.9 MP	12.3 MP	2.1 MP
Item #	Monochrome: CS165MU <sup>a</sup> Color: CS165CU <sup>a</sup>	Mono.: CS135MU Color: CS135CU NIR-Enhanced Mono.: CS135MUN	Mono.: CS235MU Color: CS235CU	Mono., Passive Cooling: CS505MU1 CS505MU Mono., Active Cooling: CC505MU Color: CS505CU1 CS505CU Polarization: CS505MUP1	Mono., Passive Cooling: CS895MU Mono., Active Cooling: CC895MU Color: CS895CU	Mono., Passive Cooling: CS126MU Mono., Active Cooling: CC126MU Color: CS126CU	Monochrome, Passive Cooling: CS2100M-USB Active Cooling: CC215MU
Product Photos (Click to Enlarge)							
Electronic Shutter	Global Shutter	Global Shutter					Rolling Shutter <sup>b</sup>
Sensor Type	CMOS	CMOS					sCMOS
Number of Pixels	1440 x 1080 (H x V)	1280 x 1024 (H x V)	1920 x 1200 (H x V)	2448 x 2048 (H x V)	4096 x 2160 (H x V)	4096 x 3000 (H x V)	1920 x 1080 (H x V)
Pixel Size	3.45 μm x 3.45 μm	4.8 μm x 4.8 μm	5.86 μm x 5.86 μm	3.45 μm x 3.45 μm			5.04 μm x 5.04 μm
Optical Format	1/2.9" (6.2 mm Diag.)	1/2" (7.76 mm Diag.)	1/1.2" (13.4 mm Diag.)	2/3" (11 mm Diag.)	1" (16 mm Diag.)	1.1" (17.5 mm Diag.)	2/3" (11 mm Diag.)
Peak Quantum Efficiency (Click for Plot)	Monochrome: 69% at 575 nm Color: Click for Plot	Monochrome: 59% at 550 nm Color: Click for Plot NIR: 60% at 600 nm	Monochrome: 78% at 500 nm Color: Click for Plot	Monochrome & Polarization: 72% (525 to 580 nm) Color: Click for Plot	Monochrome: 72% (525 to 580 nm) Color: Click for Plot	Monochrome: 72% (525 to 580 nm) Color: Click for Plot	Monochrome: 61% (at 600 nm)
Max Frame Rate (Full Sensor)	34.8 fps	165.5 fps	39.7 fps	35 fps (CS505xx1, CC505MU, CS505MUP1), 53.2 fps (CS505xx)	20.8 fps (CC895MU), 30.15 fps (CS895xx)	15.1 fps (CC126MU), 21.7 fps (CS126xx)	50 fps
Read Noise	<4.0 e <sup>-</sup> RMS	<7.0 e <sup>-</sup> RMS	<7.0 e <sup>-</sup> RMS	<2.5 e <sup>-</sup> RMS			<1 e <sup>-</sup> Median RMS; <1.5 e <sup>-</sup> RMS
Digital Output	10 Bit (Max)	10 Bit (Max)	12 Bit (Max)				16 Bit (Max)
PC Interface	USB 3.0						
Available Fanless Cooling	N/A	N/A	N/A	15 °C to 20 °C Below Ambient Temperature (CCxxxMU Cameras Only)			
Housing Size (Click for Details)	0.59" x 1.72" x 1.86" (15.0 x 43.7 x 47.2 mm <sup>3</sup> )	Passively Cooled CMOS Camera TE-Cooled CMOS Camera					Passively Cooled sCMOS Camera TE-Cooled sCMOS Camera
Typical Applications	<b>Mono. &amp; Color:</b> Brightfield Microscopy, General Purpose Imaging, Machine Vision,	<b>Mono., Color, &amp; NIR:</b> Brightfield Microscopy, Ca <sup>++</sup> Ion Imaging, Electrophysiology/Brain Slice Imaging, Flow Cytometry, Fluorescence Microscopy, General Purpose	<b>Mono. &amp; Color:</b> Autofluorescence, Brightfield Microscopy, Electrophysiology/Brain Slice Imaging, Fluorescence Microscopy, Immunohistochemistry (IHC),	<b>Mono. &amp; Color:</b> Autofluorescence, Brightfield Microscopy, Electrophysiology/Brain Slice Imaging, Fluorescence Microscopy, Immunohistochemistry (IHC),	<b>Mono. &amp; Color:</b> Autofluorescence, Brightfield Microscopy, Electrophysiology/Brain Slice Imaging, Fluorescence Microscopy, Immunohistochemistry (IHC), Machine Vision, Material Science,	<b>Mono. &amp; Color:</b> Autofluorescence, Brightfield Microscopy, Electrophysiology/Brain Slice Imaging, Fluorescence Microscopy, Immunohistochemistry (IHC), Machine Vision, Material Science,	<b>Passive &amp; Active Cooling:</b> Autofluorescence, Brightfield Microscopy, Fluorescence Microscopy, Immunohistochemistry (IHC), Material Sciences,

Compact Scientific Cameras							
Camera Type	Zelux® CMOS	Kiralux® CMOS					Quantalux® sCMOS
	1.6 MP	1.3 MP	2.3 MP	5 MP	8.9 MP	12.3 MP	2.1 MP
	Material Sciences, Materials Inspection, Monitoring, Transmitted Light Spectroscopy, UAV, Drone, & Handheld Imaging  <b>Mono. Only:</b> Multispectral Imaging, Semiconductor Inspection  <b>Color Only:</b> Histopathology	Imaging, Immunohistochemistry (IHC), Laser Speckle Imaging, Machine Vision, Material Sciences, Materials Inspection, Vascular Imaging, Monitoring, Particle Tracking, Transmitted Light Spectroscopy, Vascular Imaging, VIS/NIR Imaging  <b>Mono. Only:</b> Multispectral Imaging, Semiconductor Inspection  <b>Color Only:</b> Histopathology  <b>NIR Only:</b> Ophthalmology/Retinal Imaging	Machine Vision, Material Sciences, Materials Inspection, Monitoring, Quantitative Phase-Contrast Microscopy, Transmitted Light Microscopy  <b>Mono. Only:</b> Multispectral Imaging, Semiconductor Inspection  <b>Color Only:</b> Histopathology	Machine Vision, Material Sciences, Materials Inspection, Monitoring, Quantitative Phase-Contrast Microscopy, Transmitted Light Microscopy  <b>Mono. Only:</b> Multispectral Imaging, Semiconductor Inspection  <b>Color Only:</b> Histopathology  <b>Polarization Only:</b> Inspection, Surface Reflection Reduction, Transparent Material Detection	Materials Inspection, Monitoring, Quantitative Phase-Contrast Microscopy, Transmitted Light Microscopy  <b>Mono. Only:</b> Multispectral Imaging, Ophthalmology/Retinal Imaging, Semiconductor Inspection  <b>Color Only:</b> Histopathology  <b>CS126xx and CC126MU Only:</b> Whole-Slide Microscopy		Materials Inspection, Monitoring, Quantitative Phase-Contrast Microscopy, Quantum Dots, Semiconductor Inspection, Transmitted Light Microscopy, Whole-Slide Microscopy  <b>Active Cooling Only:</b> Electrophysiology/Brain Slice Imaging, Multispectral Imaging

- These item numbers are representative of the Zelux family. These cameras are available with or without external hardware triggers.
- Rolling Shutter with Equal Exposure Pulse (EEP) Mode for Synchronizing the Camera and Light Sources for Even Illumination

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