LIGHT-SHEET MICROSCOPY

Papilio5D

Multi-Sample and Dual-View Light-Sheet Microscope

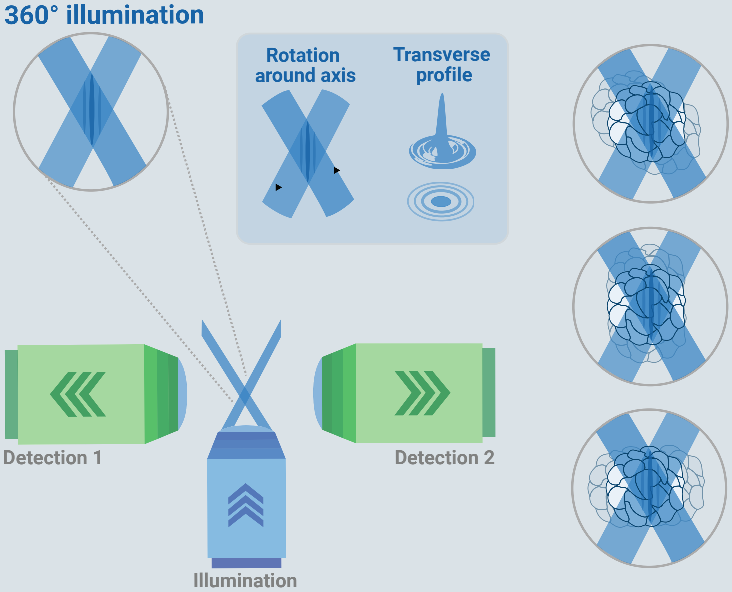
Papilio5D

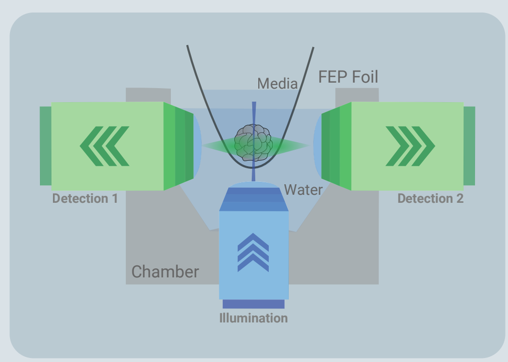
Highly Sensitive Imaging for Organoids and 3D Cell Cultures

Bruker's Papilio5D light-sheet microscope is specifically designed to provide researchers with a solution that ensures outstanding image quality and great depth-penetration for imaging a wide variety of samples, including dense organoids or zebrafish larvae. The system combines dual-view imaging with modular illumination beams for extremely efficient photon use. Dual-sided detection enables the capture of twice as many photons as single-objective detection setups and a more comprehensive 3D view of samples. Researchers can choose between Gaussian or Bessel beam illumination, both with a beam width below one micrometer. Custom-solution sample mounting also allows for seamless multiplexing conditions and pharmacology studies.

Papilio5D Bessel Beam

360° illumination





Papilio5D uses horizontal dual-view detection and a choice of Bessel or Gaussian illumination. This setup optimizes depth penetration and provides a large and evenly illuminated field of view with four different optical magnifications.

Only Papilio5D offers:

- Dual-sided detection and modular illumination beams for the highest photon collection efficiency
- Ideal light-sheet imaging of many samples under different experimental conditions at the same time
- Fast dual-view acquisition and fusion for high-resolution images

Customizable Solutions for Long-Term Imaging

Highest Image Quality

Papilio5D uses a horizontal geometry with two views for detection and perpendicular light-sheet illumination for imaging of the most delicate samples with the highest photon efficiency. Water-dipping, high-NA lenses ensure the light sheet is ultra-thin, while area- and line-mode detection allow data acquisition specialized for different sample requirements. These features offer a high signal-to-noise ratio as well as optimized ideal Z resolution and depth penetration. Papilio5D can also reach Nyquist sampling, which improves subsequent image processing and enables state-of-the-art deconvolution.

Simple and Intuitive Sample Mounting

Easy and gentle sample mounting is key to designing multi-sample and multi-condition experiments. Papilio5D has a generous sample holder that can hold up to three dishes with two separate chambers each, enabling a total of six experimental conditions to be tested at once. Sample health and integrity are further maintained with environmental control that supports long-term imaging (hours to days). The microscope provides control over temperature (20 to 37° C), gas concentration (CO_2 and O_2), and humidity.

Comparison of area vs. line mode. Area mode images quickly and efficiently, while in line mode, the camera uses a rolling shutter and improves contrast in thick samples.

Optimized Beam Patterns for Different Applications

Scientists using Papilio5D can choose the best light-sheet pattern for their experiment. A Gaussian beam is ideal for small, light-sensitive samples, such as in early mouse embryology studies. A Bessel beam, on the other hand, provides multi-direction illumination from a 360° angular range for robust imaging of even optically dense objects. Two modes of acquisition, area or line, complement these beam pattern choices.

In area mode, the camera captures the entire field of view at once, making it fast and efficient. In line mode, the camera uses the rolling shutter in a confocal slit-like manner synchronized with the scanned light-sheet. This rejects out-of-focus and scattered light, improving contrast in thick or scattering samples, as is common with organoids.

Papilio5D Specifications

Dual Sided Detection with 2x Objectives	Tube Lens	Magnification	Pixel Size [nm] Orca Flash	FOV [µm] Orca Flash	Pixel Size [nm] Orca Fire	FOV [µm] Orca Fire
Detection 2x Nikon CFI APO LWD 25x 1.10 NA	100	12.5x	520	1065	370	876
	200	25x	260	532	184	436
	300	37.5x	173	353	123	290
	400	50x	130	266	92*	218
Detection 2x Nikon CFI APO LWD 16x 0.8 NA	100	8x	813	1664	575	1362
	200	16x	406	832	288	681
	300	24x	271	555	192	454
	400	32x	203	416	144	340

Illumination Modes	Gaussian Beam	Bessel Beam
Beam Waist Thickness [µm]	1 to 6	1 (main lobe)
Beam Length [µm]	20 @ 1 µm waist	350
Pivot Scan	YES	YES
Confocal Line Mode	YES	YES
Acquisition Options	• Gaussian beam • Gaussian with line mode • Gaussian with line mode and pivot scan	• Bessel beam • Bessel beam with line mode • Bessel beam with line mode and pivot scan
Illumination Optics	20x 0.6 NA	
Detection Optics	Dual 25x 1.1 NA/ 16x 0.8 NA	
Multi-Sample/Multi-Condition Experiments	6 separate compartments	
Magnification Changer	4 discrete steps	
Data Processing	Content based dual view registration and fusion	
Photomanipulation	CW or pulsed, VIS to NIR	

*Nyquist sampling

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