

HBIAMP MICROSCOPES

FULL SPECIFICATIONS

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OLYMPUS IX81 LIVE-CELL IMAGING MICROSCOPE

TRANSMITTED LIGHT

- Brightfield
- Phase Contrast
- 60x Differential Interference Contrast (DIC) - 60x only

4-CHANNEL FLUORESCENCE IMAGING

- Singleband cubes: DAPI, GFP, TxRed, Cy5
- Fast imaging Sedat configuration: DAPI/FITC/TxRed

ACQUISITION

- autofocus, multichannel, multi-position, z-stack, time lapse, tiling & stitching

LIVE CELL INCUBATOR

- Precision Plastics Inc. environmental enclosure for temperature, humidity, and gas control

OBJECTIVES & OPTICS

- UPlanFL N 10x/0.30 NA air Ph1, WD 10.0 mm
- LUCPlanFL N 20x/0.45 NA air Ph1, WD 6.6-7.8 mm, 0-2.0 corr
- LUCPlanFL N 40x/0.60 NA air Ph2, WD 2.7-4.0 mm, 0-2.0 corr
- LUCPlanFL N 60x/0.70 NA air Ph2, WD 1.5-2.2 mm, 0.1-1.3 corr
- UPlanSApo 60x/1.30 NA silicone DIC, WD 0.3 mm, 0.15-0.19 corr

FILTERS

- DAPI - excitation: 377/50 nm, emission: 477/60 nm, dichroic: 409 nm
- GFP - excitation: 472/30 nm, emission: 520/35, dichroic: 495 nm
- Texas Red - excitation: 562/40 nm, emission: 624/40, dichroic: 593 nm
- Cy5 - excitation: 628/40 nm, emission: 692/40 nm, dichroic: 660 nm
- Fast multichannel Sedat configuration DAPI/FITC/TexasRed-3X3M-A-OMF
- excitation filter wheel: 387/11 nm, 494/20 nm, 575/25 nm
- emission filter wheel: 447/60 nm, 531/22 nm, 624/40 nm
- multi-pass dichroic: 436/514/604 nm

ILLUMINATION

- Prior Lumen 200 pro: 200W metal halide (arc) lamp
- 12V/100W halogen transmitted light source

CAMERA

- Photometrics CoolSNAP HQ2 cooled monochrome CCD
- 1.4 Mpix: 1392x1040, 6.45x6.45 um/pix

- 12-bit / 14-bit digitization
- QE 40% at 750 nm
- RN: 4.5 e- rms @ 10 MHz, 5.5 e- rms @ 20 MHz
- FWC: 16000 e- / 30000 e- (bin 2)
- 11 fps at full resolution

SOFTWARE

- MetaMorph Advanced Image Acquisition

ZEISS AXIO VERT.A1 INVERTED MICROSCOPE

TRANSMITTED LIGHT

- Brightfield
- Phase contrast

FLUORESCENCE IMAGING

- Singleband cubes: DAPI, GFP, Cy3

OBJECTIVES & OPTICS

- LD A-Plan 5x/0.15 Ph1 M27 WD11.7 inf/1.0 PS
- LD A-Plan 10x/0.25 Ph1 M27 WD8.5 inf/1.0 PS
- LD A-Plan 20x/0.35 Ph1 M27 WD 4.3 inf/1.0 PS
- LD A-Plan 40x/0.55 Ph1 M27 WD 2.0 inf/1.0 PS

FILTERS

- DAPI - excitation: 365/12 nm, emission: LP397 nm, dichroic: 395 nm
- GFP - excitation: 470/40 nm, emission: 525/50, dichroic: 495 nm
- Cy3 - excitation: 545/25 nm, emission: 605/70, dichroic: 570 nm

ILLUMINATION

- Transmitted LED Illumination (400-700 nm - 460 nm Peak)
- Epi LED modules (385nm, 470nm, neutral white 540-580 nm)

CAMERA

- Axiocam monochrome camera

SOFTWARE

- ZEN Lite software

ZEISS PALM LASER MICRODISSECTION MICROSCOPE

DESCRIPTION

This is an inverted microscope capable of bright field, phase contrast, and Apotome.2 structured illumination multichannel fluorescence imaging. Its key feature is the Laser Microdissection and Pressure Catapulting where a region of interest is microdissected and transferred to a collection device by a focused laser beam allowing for contact- and contaminant-free sampling. The system is ideal for crisp imaging and for investigating key molecules such as DNA, RNA, proteins, and living cells at unsurpassed levels of purity.

MAIN FEATURES

- Fluorescence and Structured Illumination mode: DAPI, GFP, and Cy3 filters
- Transmitted light mode: BF and Phase Contrast
- Acquisition: extended depth of focus, multichannel, z-stack, time lapse, stitching
- Laser Microdissection and Pressure Catapulting mode:
 - Laser ablation down to 1 μm
 - Pressure Catapulting, eg in PCR tubes
 - Multiple ROI selection with image-based autofocus
 - Typical thickness of 5-20 μm , up to >100 μm

OBJECTIVES

- Fluar 5x/0.25 air
- LD Plan Neofluar 20x/0.4 air
- LD Plan Neofluar 40x/0.6 air
- EC Plan Neofluar 100x/1.3 oil

ILLUMINATION & ABLATION LASER

- HXP 120 mercury short-arc reflector lamp
- HAL 100 halogen lamp
- FTSS 355 nm laser pulsed at 100 Hz

FILTER SETS

- Blue ex G365 – em 445/50
- Green ex 470/40 – em 525/50
- Red ex 550/25 – em 605/70

CAMERAS

- AxioCam Icc
- AxioCam MRm

SOFTWARE

- ZEN (download free viewer [here](#))

STANDARD OPERATING PROCEDURE

- Download [Zeiss PALM SOP](#)

OLYMPUS VS110-S5 VIRTUAL SLIDE SCANNER

DESCRIPTION

A fully motorized upright microscope capable of scanning up to five slides in a fully automated batch process. The instrument can scan in either bright field or fluorescence (up to four colors) modes with extended focal imaging and z-stack capabilities. Whole slides or multiple regions of interest can be rapidly imaged at high magnification using the autofocus, automatic specimen recognition, and auto-exposure options. Stitching and layering allow for swift and seamless overall to detailed structure viewing. The system is ideal for high-throughput histology and fluorescence, whole slide virtual archiving, as well as stereology of large fixed specimens such as brain slices.

Features

- Transmitted light: Bright Field
- Fluorescence mode: DAPI, FITC, TRITC, Cy5

Acquisition options

- Single Slide or Multiple Slides (batch)
- Manual or Autoexposure, Autofocus
- Manual ROI definition or Automated specimen/tissue recognition
- Single plane, Maximum Intensity Projection (MIP), Extended Focal Imaging (EFI), or Z-stack
- 4 Channel Multicolor Fluorescence

Objectives

- PlanApoN 2x/0.08 air
- UPlanSApo 10x/0.4 air
- UPlanSApo 20x/0.75 air
- UPlanSApo 40x/0.95 air
- UPlanSApo 60x/1.35 oil

Illumination

- X-Cite exacte mercury vapor short-arc lamp
- 100 W halogen lamp

Filters – Sedat Configuration

- Blue ex 387/11 – em 440/40
- Green ex 485/20 – em 525/30
- Red ex 560/25 – em 607/36
- Far Red ex 650/13 – em 684/24

Cameras

- Olympus XC10
- Olympus XM10

Software

- VS-ASW-S5 (V2.9) with Batch Converter
- CellSens Dimension Desktop (Offline Analysis; download free OlyVIA viewer [here](#))

Standard Operating Procedure

- Download [Olympus VS110-S5 SlideScanner SOP](#)

OLYMPUS VS120-L100 VIRTUAL SLIDE SCANNER

Description

The Olympus VS120-L100 Virtual Slide Microscope is designed for high throughput research and pathology. Working on the same platform and software as the VS110 5-slide system, the VS120 is a fully automated whole slide scanning microscope capable of digitally imaging up to 100 standard (25 x 75 mm) slides (including labels and barcodes) or single 75 x 50 mm slide in either bright field or fluorescence. Automated focus, sample detection, and stitching allow for swift and seamless overall structure visualization from low to high magnification. Multi-plane (z-stacks) scanning allows for maximum intensity projection (MIP) and extended focal imaging (EFI) of thick tissue sections. Fly-eye optics coupled with multi-band filters, multi-color light source (7 individually controlled bands), and sensitive sCMOS camera allows for rapid multi-color fluorescence imaging. This system is ideal for “batch” imaging multiple slides and large areas.

Main features

- Transmitted light: Bright Field
- Fluorescence (see Filters below):
 - Multiband: DAPI, FITC, TRITC, Cy5
 - Multiband: CFP, YFP, RFP
 - Singleband: DAPI, FITC, TRITC, Cy5

Acquisition options

- Single 75 x 50 mm Slide or Multiple 25 x 75 mm Slides (batch)
- Manual or Autoexposure, Manual or Autofocus
- Manual ROIs definition or Automated specimen/tissue recognition
- Single plane, Maximum Intensity Projection (MIP), Extended Focal Imaging (EFI), or Z-stack
- 4 Channel Multicolor Fluorescence: rapid “strobing” mode or standard mode

Objectives

- PlanApoN 2x/0.08 air
- UPlanSApo 10x/0.4 air
- UPlanSApo 20x/0.75 air
- UPlanSApo 40x/0.95 air

Illumination

- Lumencor Spectra X light engine (380 - 680 nm)
- 100 W halogen lamp

FILTERS

Multi band <i>(Switch channels before moving XY)</i>				Single band <i>(Move XY before switching channels)</i>				
DAPI-FITC-TRITC-Cy5			CFP-YFP-RFP**					
	<u>Ex (nm)</u>	<u>Em (nm)</u>		<u>Ex (nm)</u>	<u>Em (nm)</u>			
DAPI	391/32	435/30	CFP	436/28	474/24	DAPI	375/28	460/50
FITC	479/33	520/30	YFP	506/21	540/24	FITC	480/30	535/40
TRITC	554/24	594/32	RFP	578/24	642/80	TRITC	540/25	605/55
Cy5	638/31	694/60				Cy5	638/31	694/60

Notes:** Filter change needed, please contact AMP staff

(If you require a filter set suited to mCHERRY/Texas Red, use the CFP/YFP/RFP multiband)

Cameras

- Allied Vision Pike F-505C color CCD camera (8-bit Brightfield)
- Hamamatsu Orca Flash 4.0 sCMOS monochrome (16-bit Fluorescence)

Software

- VS-ASW-L100 (V2.9) with Batch Converter
- CellSens Dimension Desktop (Offline Analysis; download free OlyVIA viewer [here](#))

Standard Operating Procedure

- Download [Olympus VS120-L100 SlideScanner SOP](#)

MOLECULAR DEVICES IMAGEXPRESS MICRO XLS WIDEFIELD HIGH CONTENT ANALYSIS SYSTEM

DESCRIPTION

The [Molecular Devices ImageXpress Micro XLS Widefield High Content Analysis System](#) is an automated fluorescence imaging & analysis platform. Laser-based focusing, high resolution coil-driven stage, as well as motorized filter cube and objective changers allow for fast and high quality multiposition, multichannel, 2D or 3D, timelapse imaging. Advanced MetaXpress analysis modules and journals further provide real-time and/or post acquisition image processing and analysis. Compatible with various types of well plates and with complete environmental control (temperature/gas/humidity), the system is ideal for live-cell high-throughput screening, but is also capable of large area slide or petri dish scanning (tiling & stitching)

MAIN FEATURES

- 5-channel fluorescence imaging: DAPI, FITC, Cy3, TxRed, Cy5
- linear encoded 100 nm resolution voice coil-driven xyz stage
- Compatibility with slides, 35 mm dishes (custom-made), and well plates (6- to 1536-well, thin to thick bottoms, glass to plastic, transwell, low profile- and low volume-plates)
- High speed 690 nm laser focusing

INCUBATOR ENVIRONMENTAL CONTROL

- Temperature: 30-40°C ± 0.5°C with feedback
- Gas/Air mixture: user-defined premixed air
- Humidity: evaporation < 0.5 µL/well/hour (96- or 384-well formats)

ACQUISITION & ANALYSIS OPTIONS:

- Well plates, Single or Three Slides, Petri dishes
- Manual or Autoexposure
- Laser-based and/or Image-based Autofocus
- Multi- Well, Site, Position Imaging
- Timelapse
- Single plane or Z-stack
- 5 Channel Multicolor Fluorescence
- Real-Time and/or Post Acquisition Image Processing & Analysis

OBJECTIVES

- 4-position automated objective changer
- (variety of Nikon 1x- 100x air and oil immersion lenses available)
- S Fluor 4x/0.2 NA WD15.5 mm
- CFI PlanFluor 10x/0.3 NA air, WD16.0 mm
- CFI SuperFluor 10x/0.5 NA air, WD1.2 mm
- CFI SuperPlanFluor 20x/0.45 NA air, corr, ELWD7.0-8.1 mm
- CFI SuperPlanFluor 40x/0.60 NA air, corr, ELWD2.8-3.6 mm

ILLUMINATION

- Sutter Instrument Lambda LS Xenon arc-lamp: 300W, 340-680 nm

FILTERS

- 5-position automated filter cube changer
- Blue ex 387/11 – em 447/60: DAPI, AF350, AMCA, BFP, Hoechst, LysoSensory, Marina Blue, Pacific Blue
- Green ex 482/35 – em 536/40: FITC, AF488, BODIPY, Calcein, Fluo-4, MitoTracker Green, Oregon Green, GFP
- Yellow ex 531/40 – em 593/40: Cy3, DsRed, AF555, Calcium Orange, LysoTracker Yellow, MitoTracker Orange, PE
- Red ex 562/40 – em 624/40: Texas Red, mCherry, 5-ROX, AF568 & 594, Calcium Crimson, Cy3.5, HcRed, MitoTracker Red
- FarRed ex 628/40 – em 692/40: Cy5, AF647 & 660, APC, BODIPY 650/665, DiD, SYTO Red, TOTO-3

CAMERA

- Photometrics CoolSNAP HQ monochrome CCD
 - 1.4 Mpix: 1392x1040, 6.45x6.45 um / pix
 - 10/20 MHz 12-bit digitization
 - QE 60% at 550 nm
 - RN: 6 e- rms @ 10 MHz, 8 e- rms @ 20 MHz
 - FWC: 15000 e- / 30000 e- (binned 2)
 - 10 fps at full resolution

SOFTWARE

- MetaXpress High-Content Image Acquisition and Analysis
- Application Modules: Multiwavelength Cell Scoring, Neurite Outgrowth, Granularity, ...

STANDARD OPERATING PROCEDURE

- Download [ImageXpress SOP](#)

LEICA TCS SP8 HIGH SENSITIVITY LASER CONFOCAL MICROSCOPE

DESCRIPTION

The Leica TCS SP8 is a state-of-the-art inverted laser confocal microscope featuring spectrally tunable high sensitivity detectors, gentle and uniform linear X2Y three mirror scanning, and efficient multipoint imaging, image tiling and stitching. It is ideal for large samples (including well plates), low light applications, samples with spectrally overlapping probes, or experiments with spectral shifts due to interactions with the environment.

MAIN FEATURES

- Widefield Fluorescence (eyepiece): DAPI, FITC, and Rhodamine filters
- Brightfield Transmitted Light (eyepiece)
- Confocal Laser Scanning (Galvo scanner)
- Homogenous illumination via X2Y scanner & linear scanning
- Scan speed up to 1800 Hz (approx 3 fps at 512x512)
- 4 spectrally tunable channels (between 380 and 800 nm)
- High resolution overview via large FOV & 8192 x 8192 scan format
- Acquisition: scan zoom (0.75x - 48x), tiling & stitching, multiposition, z-stack, time lapse, lambda scans, unmixing

4 X TUNABLE DETECTION CHANNELS

- 2 x low dark current Hamamatsu PMT detectors
- 2x high sensitivity hybrid detectors: these combine GaAsP PMT and avalanche photodiode for twice the quantum efficiency of standard PMTs; they can also be used in photon-counting mode

OBJECTIVES

- 5x / 0.15NA (HC PL FLUOTAR)
- 10x / 0.40 NA (HC PL APO CS2)
- 25x / 0.95 NA water (HC FLUOTAR, 2.4mm WD, 0.17 VISIR)
- 63x / 1.30 NA glycerol (HC PL APO CS2, 0.14-0.19 CORR)

LASERS

- 405 nm diode laser (DAPI, Hoechst)
- 488 nm diode laser (GFP, YFP, FITC, Alexa488)
- 552 nm diode laser (Cy3, Alexa 546/568/594, mCherry)
- 640 nm diode laser (Cy5, Alexa 647)

SOFTWARE

- Leica Application Suite X (download free LAS X Core viewer [here](#))

STANDARD OPERATING PROCEDURE

- Download [Leica SP8 SOP](#)

LEICA SP8 FALCON – FLUORESCENCE LIFETIME IMAGING LASER CONFOCAL MICROSCOPE

DESCRIPTION

SP8 FALCON (FAst Lifetime CONtrast) is a fast and completely integrated fluorescence lifetime imaging microscopy (FLIM) confocal platform. SP8 FALCON delivers video-rate FLIM with pixel-by-pixel quantification, thanks to a novel concept for measuring fluorescence lifetimes built on fast electronics and sensitive spectral hybrid detectors. Photon arrival times are recorded at count rates typical for standard confocal imaging. The system has ultra-short dead time and powerful built-in algorithms for data acquisition and analysis. The deep integration of FLIM into the confocal platform provides easy access to complex FLIM experiments.

MAIN FEATURES

- Widefield Fluorescence (eyepiece): DAPI, FITC, and Rhodamine filters
- Brightfield Transmitted Light (eyepiece) + Transmitted light detector
- Confocal Laser Scanning (Galvo scanner)
- X2Y linear Galvo scanner and X2Y 12kHz Resonant scanner (both with scan rotation)
- Super Z-Galvo stage (fast Z-stack)
- 5 spectrally tunable channels (between 380 and 800 nm)
- High resolution overview via large FOV & 8192 x 8192 scan format
- Acquisition: scan zoom (0.75x - 48x), tiling & stitching, multiposition, z-stack, time lapse, lambda scans, unmixing

5 X TUNABLE DETECTION CHANNELS

- Variable filters 380 - 800 nm
- 1 x low dark current Hamamatsu PMT detectors
- 2 x high sensitivity hybrid detectors (photon counting mode available)
- 2 x cooled high sensitivity, single molecule detection (SMD) hybrid detectors (optimized from FLIM)

OBJECTIVES

- 2.5x / 0.07NA (HC PL FLUOTAR)
- 5x / 0.15NA (HC PL FLUOTAR)
- 10x / 0.40 NA (HC PL APO CS2)
- 20x / 0.8NA (HC PL APO)
- 25x / 0.95 NA water (HC FLUOTAR, 2.4mm WD, 0.17 VISIR)
- 63x / 1.40 NA oil (HC PL APO CS2, 0.14-0.19 CORR)

LASERS

- 405 nm diode laser
- 440 nm pulsed diode laser
- Tunable White Light Laser 470 - 670 nm (1nm increments) 10 - 80 MHz Rep Rate using Acousto-Optical Beam Splitter (AOBS)

SOFTWARE

- Leica Application Suite X (download LASX Core viewer)
- FALCON FLIM Module with Phasor FLIM Analysis

STANDARD OPERATING PROCEDURE

- [Download Leica TCS SP8 FALCON SOP](#)

WORKSTATION

- Intel 6134 XEON 3.2GHz (8 Core)
- 192GB RAM
- NVIDIA Quadro GP100 16GB Reference GPU (3584 Cuda Cores)
- 256GB SATA SSD
- 6TB SATA Enterprise
- 2TB M.2 SSD
- 10 GBit INTEL X710 Network Adapter
- Windows10 IoT Enterprise

NIKON A1R MICROSCOPE

• DESCRIPTION

- The Nikon A1R Microscope is an upright laser scanning microscope capable of standard confocal imaging, and spectral imaging.

• MAIN FEATURES

WIDEFIELD FLUORESCENCE (EYEPIECE)

- DAPI, GFP, and DSRed filters

CONFOCAL LASER SCANNING

- Galvo-Galvo or high-speed Galvo-Resonant scan modes
- 4 channel standard PMT detectors
- 32 channel spectral MA detector:
- 400-750 nm visible range
- 2.5/5/10 nm variable resolution

Objectives

- Plan Apo 10x/0.45 NA air
- Plan Fluor 20x/0.75 NA multi-immersion
- Plan Apo 60x/1.27 NA water
- Multiphoton: LWD 3.0 mm 16x/0.80 NA water
- Multiphoton: Apo LWD 2.0 mm 25x/1.10 NA water

• LASERS

- 405 nm diode laser (DAPI)
- 457, 477, 488, 514 nm Ar-Ion (GFP, YFP, FITC, Alexa488) - 561 nm diode laser (Cy3, Alexa 546/568/594, mCherry)
- 640 nm diode laser (Cy5, Alexa 647)

COMMON FILTER COMBINATIONS

- Blue, Green, Red, Far Red: 450/50 - 525/50 - 600/50 - 685/70 nm

SOFTWARE

- NIS Elements AR (download free viewer [here](#))

Standard Operating Procedure

- Download [Nikon A1mp SOP](#)

NIKON C1SI SPECTRAL CONFOCAL MICROSCOPE

DESCRIPTION

The Nikon C1si Spectral Confocal Microscope is an inverted laser scanning confocal microscope capable of both standard confocal imaging and spectral imaging. It is ideal for fixed specimens on glass slides or petri dishes (cover slip #1.5), but can also be used for live cell/tissue imaging with well plates and petri dishes.

MAIN FEATURES

- Widefield Fluorescence (eyepiece): DAPI, GFP, and TxRed filters
- Brightfield Transmitted Light (eyepiece): BF or DIC
- Confocal Laser Scanning (Galvo-galvo)
- 3 channel standard PMT detectors & 1 channel DIC transmitted light detector
- 32 channel spectral multi-anode detector
- 400 - 750 nm visible range
- 2.5/5/10 nm variable resolution
- Focus Drift Compensation via Perfect Focus System (PFS)
- Acquisition: zoom optics, multipoint, z-stack, time lapse, stitching, unmixing

OBJECTIVES

- Plan Apo 10x/0.45 NA air
- Plan Apo 20x/0.75 NA air
- Plan Fluor 40x/1.30 NA oil
- Plan Apo 60x/1.20 NA water

LASERS

- 405 nm (DAPI)
- 457, 477, 488, 514 nm (GFP, YFP, FITC, Alexa488)
- 561 nm (Cy3, Alexa 546/568/594, mCherry)
- 640 nm (Cy5, Alexa 647)

COMMON FILTER COMBINATIONS

- Blue, Green, Red: 450/35 - 525/50 - 595/50 or 605/60
- Green, Red, Far Red: 525/50 - 595/50 or 605/60 - 685/70

SOFTWARE

- EZ-C1 (download free viewer [here](#))

LAVISION BIOTEC ULTRAMICROSCOPE II – LIGHTSHEET MICROSCOPE

DESCRIPTION

This is a light sheet fluorescence microscope that uses bidirectional triple light sheet (generates 6 focused light sheets) to excite samples from the side while the fluorescence emission is detected by a sCMOS camera perpendicular to the illumination plane. 3D image stacks are created by moving the sample through the light sheets. Selective plane illumination reduces photo-bleaching/toxicity. This instrument is ideal for 3D imaging of large cleared samples in any clearing solution or aqueous media. A chamber with environmental control allows for in-vivo imaging and a modular optical setup allows for increased speed, lateral (xy) and/or axial (z) resolution.

MAIN FEATURES

- Fast 3D imaging or large cleared samples
- Sample size: up to 30 mm x 30 mm x 15 mm
- Field of view (FOV): diagonal of 17.6 mm
- Optical zoom: from 1.26x to 12.6x
- Dynamic horizontal focusing for better axial resolution
- 6 light sheets for homogenous illumination
- Compatible with aqueous buffers and organic solvents
- Compatible clearing protocols include: Scale, SeeDB, CLARITY, DISCO, BABB, CUBIC
- Live / In-vivo 3D imaging with controlled environment
- High magnification imaging via refractive index corrected objective lenses
- Acquisition: z-stack, tiling, multipoint, time lapse

OBJECTIVES

- Olympus MVPLAPO 2x/0.50 NA with 5.7, 6 and 10 mm WD dipping caps
- LVBT PLAN 12X/0.53 NA 9.0 mm WD with 1.33, 1.45 and 1.56 RI corrected dipping caps
- Olympus XLSLPLN25XGMP 25X/1.0 NA 8.0 mm WD with correction collar for RI 1.41 to 1.52

LASERS

- 405 nm diode laser (DAPI)
- 488 nm diode laser (GFP, YFP, FITC, Alexa 488)
- 561 nm diode laser (Cy3, Alexa 546/568/594, mCherry)
- 640 nm diode laser (Cy5, Alexa 647)
- 785 nm diode laser

FILTERS

- Blue: 460/40
- Green: 525/50
- Red: 595/50
- Far Red: 670/50
- Near Infrared: 845/55

CAMERA

- Andor Zyla 4.2 Plus sCMOS camera
 - 4.2 Mpix: 2048 x 2048; 6.5 x 6.5 μ m / pix
 - QE >75% @ 500-650 nm & 82% @ peak
 - RN: 1.1 e- rms @ 216 MHz
 - FWC: 30000 e-
 - 53 fps at 12-bit full resolution

SOFTWARE

- LaVision BioTec ImSpector

STANDARD OPERATING PROCEDURE

- Download [LVBT Lightsheet SOP](#)

THORLABS BERGAMO® II MULTIPHOTON MICROSCOPE

DESCRIPTION

- A completely modular multiphoton imaging platform that adapts to a wide range of experimental requirements. Featuring five axes of movement including a rotating body, which allows the microscope to rotate around the sample. Equipped with fast resonant scanners and sensitive detectors.

MAIN FEATURES

WIDEFIELD FLUORESCENCE

- DAPI and GFP LEDs and filter sets
- 5MP Monochrome CMOS Kiralux Thorlabs camera

LASER SCANNING

- 450-1100 nm wavelength range
- Dual scan paths: Galvo-Galvo (GG) and Galvo-Resonant (GR)
 - (GG): 3 fps @ 512x512 Pixels; 48 fps @ 512x32 Pixels; 70 fps @ 32x32 Pixels. Pixel dwell time: 0.4 - 20 μ s
 - (GR): 12 kHz: 4.4 fps (2048 x 2048 Pixels); 45 fps (512 x 512 Pixels); 600 fps (512 x 32 Pixels)

DETECTION

- 2 x High sensitivity GaAsP PMTs

Objectives

- Multiphoton: LWD 3.0 mm 16x/0.80 NA water
- Multiphoton: Apo LWD 2.0 mm 25x/1.10 NA water
- Can accept any Infinity-corrected objectives with M34 x 1.0, M32 x 0.75, M25 x 0.75, or RMS threads

LASERS

- Coherent Chameleon Ultra II Ti:Sapphire femtosecond pulsed laser: 680 – 1080 nm tuning range

ADDITIONAL FEATURES

- Piezo objective scanner: Enables objective positioning and Z-Stack acquisition with Resolution \sim 1 nm
- X/Y translation: 2" (50.8 mm) Total Fine Travel; 0.5 μ m Encoder Resolution
- Z translation:
 - Base (Coarse) 5" (127 mm) Total Coarse Z Travel; 1 μ m Encoder resolution
 - Objective (Fine) 1" (25.4 mm) Total Fine Travel; 0.1 μ m Encoder resolution
 - Piezo Objective Scanner – Open Loop: 600 μ m \pm 10% Travel Range; 1 nm resolution – Closed Loop: 450 μ m Travel Range; 3 nm resolution.
- Rotation: 0° to 90° around the Sample.
- Pockels Cell:
 - Edge and fly-back blanking to minimize sample photobleaching.
 - High-speed masking for rois – customize laser power at each slice using software control.

SOFTWARE

- ThorImage®LS