



# MPX-SERIES MULTI-PHOTON MICROSCOPES

## EXTENDED CAPABILITIES – TURN-KEY, FLEXIBLE, MULTIMODAL, COMPACT

The MPX-series multi-photon multimodal imaging platform is based on a modular concept. We offer three standard models where each can be upgraded with various options and accessories, as well as entirely custom designed setups - to completely maximize the utility.

This offers every user the unique flexibility to design a multi-photon microscope tailored to their specific need and budget.

	MPX-1040	MPX-920F	MPX-Tune*
1 <sup>st</sup> wavelength fixed: 1040 nm	✓	✓	✓
2 <sup>nd</sup> wavelength fixed: 920 nm (others upon request)	Optional	✓	✗
2 <sup>nd</sup> wavelength tunable: 740 - 1250 nm	✗	✗	✓
Resonant - galvo-galvo scanning module	Optional	Optional	Optional
Single-photon fluorescence modality	Optional	Optional	Optional
Brightfield Epi-modality	Optional	Optional	Optional

\* Available in Q2/2021.

# BASIC VERSIONS MPX-SERIES

Laser source: built-in femtosecond lasers	MPX-1040	MPX-920F	MPX-Tune*
1 <sup>st</sup> wavelength fixed: 1040 nm All parameters @ sample: 80 MHz (40 MHz**), >600 mW, <130 fs (using Nikon 16x objective)	✓	✓	✓
2 <sup>nd</sup> wavelength fixed: 920 nm All parameters @sample: 80 MHz, >200 mW@920 nm & >500 mW @1040 nm, <130 fs (using Nikon 16x objective)	✗	✓	✗
2 <sup>nd</sup> wavelength tunable: 740 - 1250 nm 80 MHz, >200 mW / output, <150 fs @sample (using Nikon 16x objective)	✗	✗	✓

MPI signal detection	
Epi-detection (up to 4 PMTs)**	Two ultrasensitive GaAsP PMTs, non-cooled, spectral response 380 nm - 720 nm, dark count rate <5000/s included.
Collection optics	12° collection angle
Transimpedance amplifiers (TIA)	SHG & 2PEF fluorescence filter set included (notch and dichroic filters). Manual exchange of individual filters.
	Filter bandwidth & gain separately configured and controlled through software.

Controller	
Umbilical	Non-detachable umbilical between controller and scanhead, >2.0 m length.
Embodiment	Stand-alone controller with handles and wheels.
Cooling	No chiller, fully aircooled
Power	Single phase, 85 - 240 VAC, 10 A max (max 800 W total power consumption).
Built-in PC hardware	ATX gaming board, AMD Ryzen 9 3900X, 64 GB RAM DDR4, 500 GB SSD NVMe, 4 TB HDD, Quadro RTX 4000 GPU.
Display	31", Ultra HD 4K, <5ms, 100% REC 709, 100% sRGB
Keyboard and mouse	Included, QWERTY (or QERTZ)
Weight scanhead	10 kg
Weight controller	30 kg
Size scanhead	50 cm x 40 cm x 15 cm (WxHxD).
Operating environment	18°C - 28°C. Extended operating conditions available.**
Storage temperature	-15°C to +50°C
Humidity	10% - 90% (non condensing).
Noise level	<70 dBA.
Altitude	2500 m max.

Cockpit	
Auxilliary control device	Main functions of the system can be controlled via auxilliary interface to gain quick and direct access to individual settings and controls.

(I) Modality MPI: multi-photon fluorescence imaging	
Motorized laser power control	0.5 % - 100 %
Laser polarization	Circular
Scan path	Resonant** - Galvo-Galvo scanner
Scan speed (Galvo-Galvo)	4.6 fps at 512 x 512 pixels 0.3 fps at 2048 x 2048 pixels Pixel dwell time: 0.8 to 32 µs
Field of view (FOV)	20 mm diagonal square (max) at the intermediate image plane.
Beam diameter @ objective back aperture plane	20 mm
Point spread function	Depending on installed objective.
Scan zoom (digitally via ScanImage)	1x to 99x
Scan resolution	Up to 2048 x 2048 pixels (Both bi- and unidirectional).

Objectives	
Turret	3-positions, motorized & software controlled
Objectives	Nikon 16x N16XLWD-PF objective included. System requires infinity corrected objectives
Turret threading	M34 x 1.0

Software	
ScanImage Premium V2020 or higher	Laser scanning
Chromogazer™	System monitoring & modality change
MS Windows™ 10 64-bit Professional	PC operating system
ImageJ (Fiji)	Image post-processing
Matlab	Scanimage and house-written acquisition scripts
µManager	ImageJ plugin for single-photon fluorescence acquisition

\* Available in Q2/2021.  
\*\* Optional, please enquire.

# OPTIONS / ACCESSORIES

	MPX-1040	MPX-920F	MPX-Tune*
Resonant Galvo-Galvo	✓	✓	✓
Single-photon fluorescence	✓	✓	✓
Brightfield Epi-modality	✓	✓	✓
Piezo z-Stage (PFOC)	✓	✓	✓
Linear polarization (motorized rotation)	✓	X	X
SPF filter set change (motorized)	✓	✓	✓
Additional PMT channel (incl. TIA)	✓	✓	✓
Motion control system	✓	✓	✓
XYZ linear translation scanhead movement, >100mm travel range each, joystick	✓	✓	✓
Inverted configuration	✓	✓	✓
Fixture for inverted configuration	✓	✓	✓
On special request: structured light illumination, photostimulation, FLIM	✓	✓	✓

## (II) Modality SPF: single-photon fluorescence imaging

Excitation lightsource for single-photon / linear fluorescence imaging	Fully integrated 8 channel cw light source for DAPI, CFP, FITC, YFP, TRITC, mCherry, Cy5 and Cy7 (395 nm, 438 nm, 475 nm, 511 nm, 555 nm, 575 nm, 635 nm, 747 nm), >150 mW / color @sample. TTL / USB external access** <20 ms switching time. Excitation filters installed.
Filter set	Dichroic and emission filter sets individually optimized for 5+3 channels included. Both filter sets manually changeable.
Single-photon fluorescence camera	sCMOS monochrome, 6.5 µm pixel size, readout noise 2.1 med e-, quantum efficiency up to 80 %, spectral range 370 nm - 1100 nm, dark current (typ.) 15 e- / pixel / s.

## Resonant Galvo-Galvo

Resonant Galvo-Galvo 30 fps at 512 x 512 pixels (8 kHz resonant galvo CRS8K)

## Motorized modality I, II & III change

Switching between operation mode modality I to III is motorized via Chromogazer™ software. Objective positions on turret can be selected individually and used for each modality. Manual fluorescence filter set change required (motorized as an option)\*\*, depending on installed filters.

## (III) Modality BFI: brightfield Epi imaging

Illumination	White light. Built-in 8-channel cw light source mimics broadband white light illumination characteristics via pre-defined settings.
Filter set	50% transmission & reflection dichroic for homogenous light transmission.
Brightfield camera	CMOS 5.1MP, 2/3", 3,45 x 3,45 µm pixel size, color, 2448 x 2048, 35 fps, global shutter.

## PMTs

The base version contains 2 PMTs in Epi-direction. Additional PMTs can be installed. Four PMTs can be controlled and operated simultaneously by ScanImage at a given time.

## Motion control

Microscope body (scanhead) motion	Free-moving scanhead, translation and rotation in all directions. Various motion solutions available**.
Piezo objective scanner	Not included. Various piezo objective scanners can be integrated**.

## Extra software

Widefield Imaging (single-photon fluorescence & brightfield)	Pre-installed & configured µManager
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## SERVICE PACKAGES AND WARRANTY

- Installation and training at customer site
- Free training at PI factory
- System upgrade after purchase
- Standard warranty 24 months included in base price. Can be extended up to 5 years in total.\*\*

\* Available in Q2/2021.

\*\* Optional, please enquire.

DAPI-stained healthy mouse knee cryosection  
(multi-photon setup, 25x, NA 1.0, 700 µm) –  
overlay of 2P-460 (blue), SHG-515 nm (green) and 2P-542 nm (red).

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# CONTACTS

## EU

### **Prospective Instruments LK OG**

Stadtstrasse 33, 6850 Dornbirn, Austria  
Phone +43 5572 206 456  
Email [contact@p-inst.com](mailto:contact@p-inst.com)  
[www.p-inst.com](http://www.p-inst.com)

## Switzerland

### **Prospective Instruments GmbH**

Althardstrasse 70, 8105 Regensdorf,  
Switzerland  
Phone +41 79 768 41 22  
Email [contact@p-inst.com](mailto:contact@p-inst.com)  
[www.p-inst.com](http://www.p-inst.com)

## USA

### **two-level systems**

442 W. Hamilton Street  
Suite # 4275  
Allentown, PA, 18101  
Phone (610) 880-7503  
Email [info@two-levelsystems.com](mailto:info@two-levelsystems.com)  
[www.two-levelsystems.com](http://www.two-levelsystems.com)

## China

### **Sinsi Technology Co., Ltd.**

F2, No. A20, Block 13, HEping Street,  
Chaoyang District, Beijing 100013, China  
Phone +86 10 61666616-602  
Email [info@sinsitech.com](mailto:info@sinsitech.com)  
[www.sinsitech.com](http://www.sinsitech.com)

### **Leads Bio-Technology Limited**

Rm. CA158, Bld. 22, No. 1-30, Lane 88 Min  
Bei Road  
Minhang District, Shanghai 201107, China  
Phone +86 18260099904  
Email [info@leads-tech.com](mailto:info@leads-tech.com)  
[www.leads-tech.com](http://www.leads-tech.com)



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