SIMTRUM

Point Scan Confocal Microscope

SIMSCOP P Series

2023 V2

For customized projects please Contact us:

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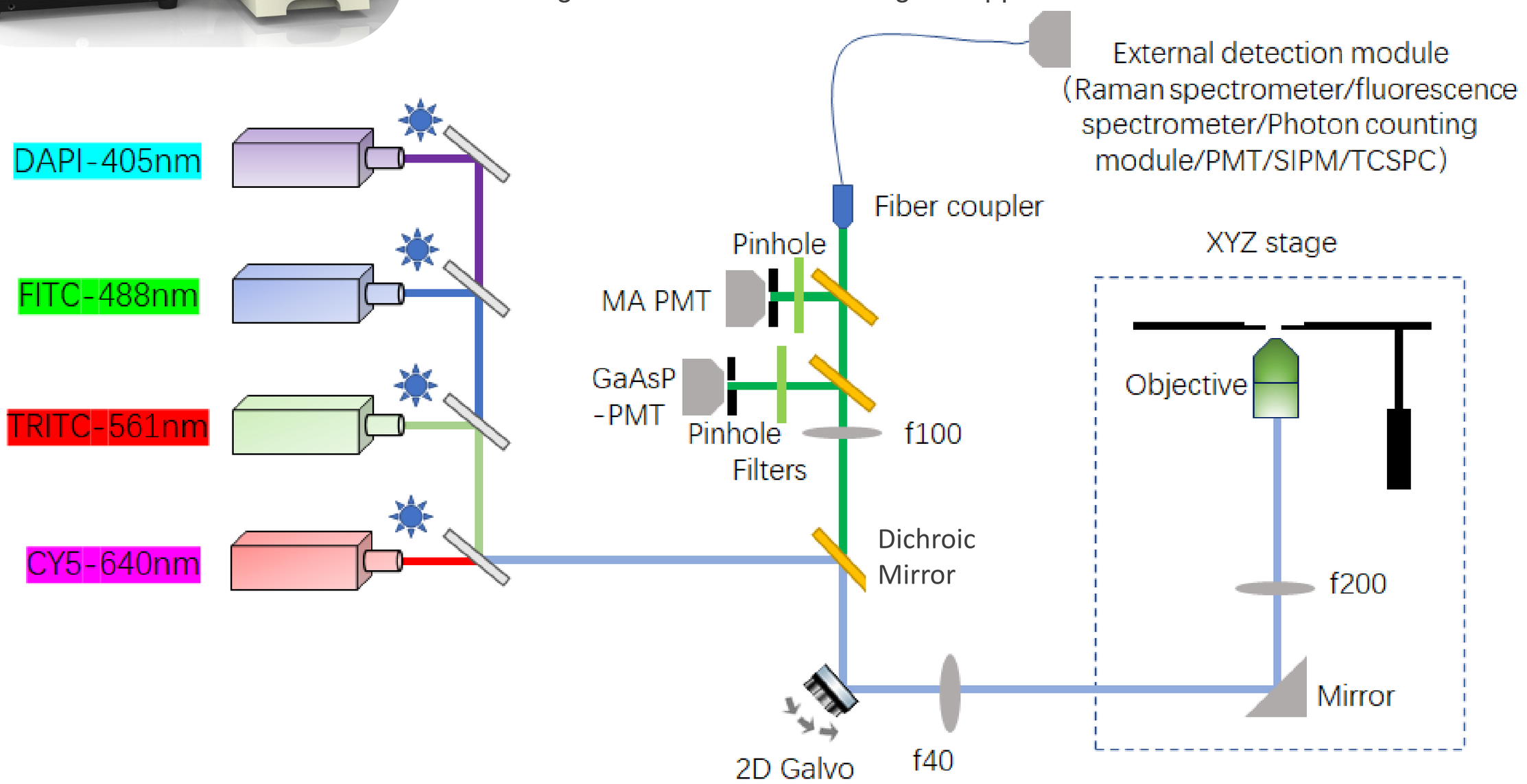
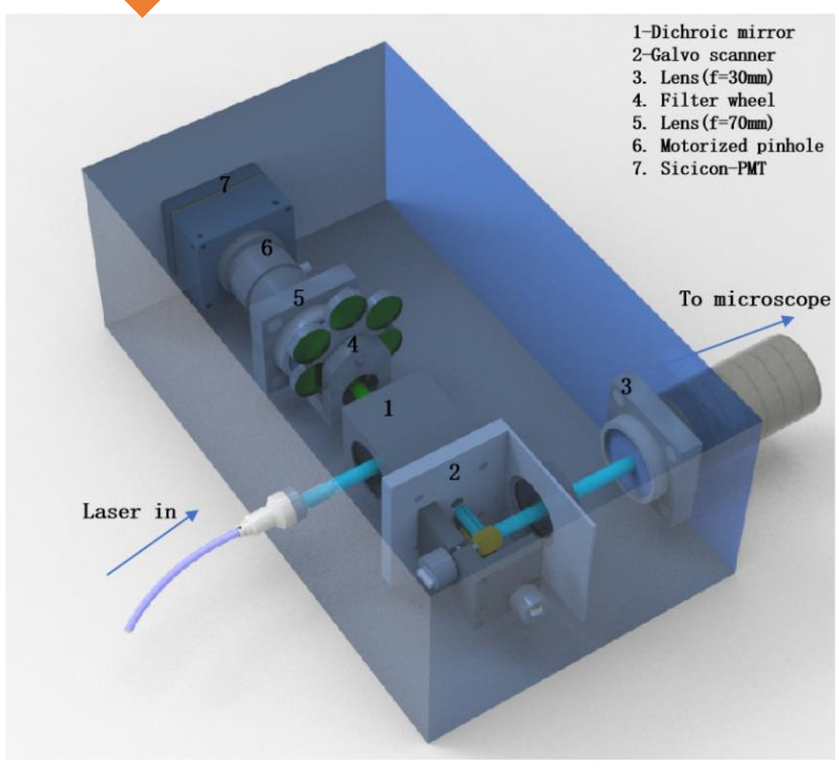
Confocal Microscopy is an optical imaging technique for increasing the Optical Resolution and Contrast of a Micrograph by using a Spatial Pinhole to block out-of-focus light in image formation. Capturing multiple two-dimensional images at different depths in a specimen enables the reconstruction of three-dimensional imaging.

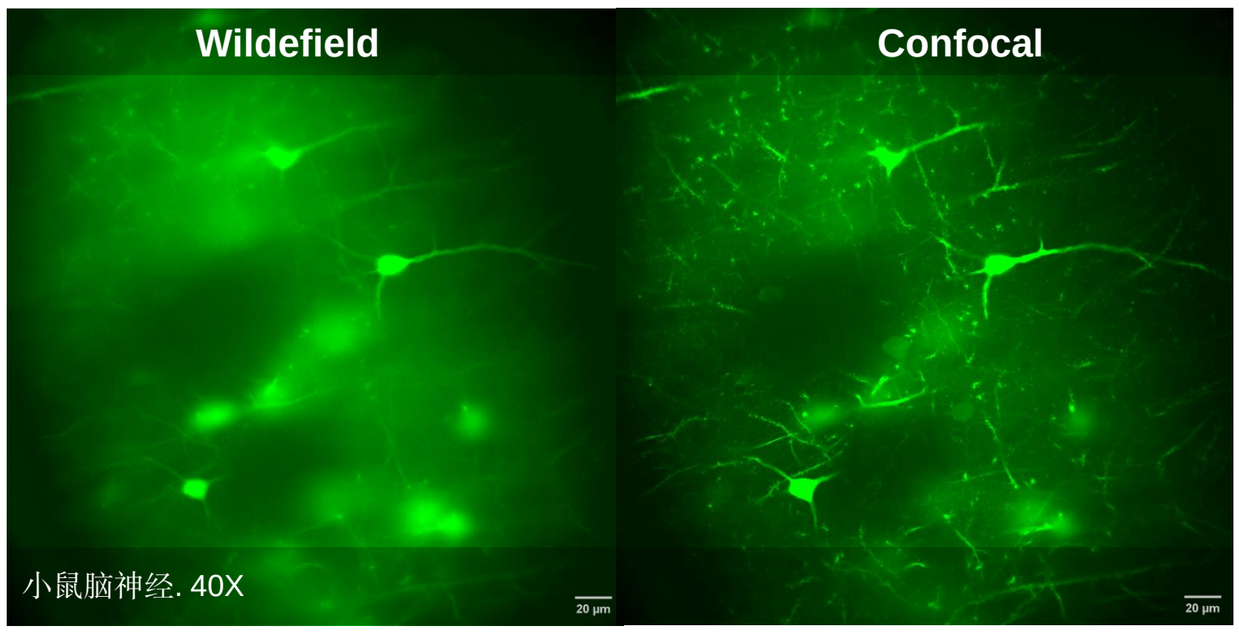
Our recently released “2+1” SIMSCOP P series Confocal Microscope offers 2 channel imaging detector and 1 functional detection channel with several options. The ability to simultaneously collect signals from two channels can be advantageous for dynamic studies, such as tracking the movement of labeled particles or observing live cell processes. It allows you to capture multiple aspects of the sample's behavior in real-time. The presence of a functional channel allows you to capture spectral or lifetime information from the sample, making it suitable for a wide range of applications.



Advantage

- 2 channels for simultaneous two-color imaging
- Higher acquisition speed,
- Flexible selection of laser lines and detector type
- Adaptable to SIPM, PMT(MA), PMT(GaAsP), PMT(GaAs)
- Reserved channels support modular upgrades
  - ✓ Raman spectrometer
  - ✓ Fluorescence spectrometer
  - ✓ TCSPC module
  - ✓ NIR I/II detector



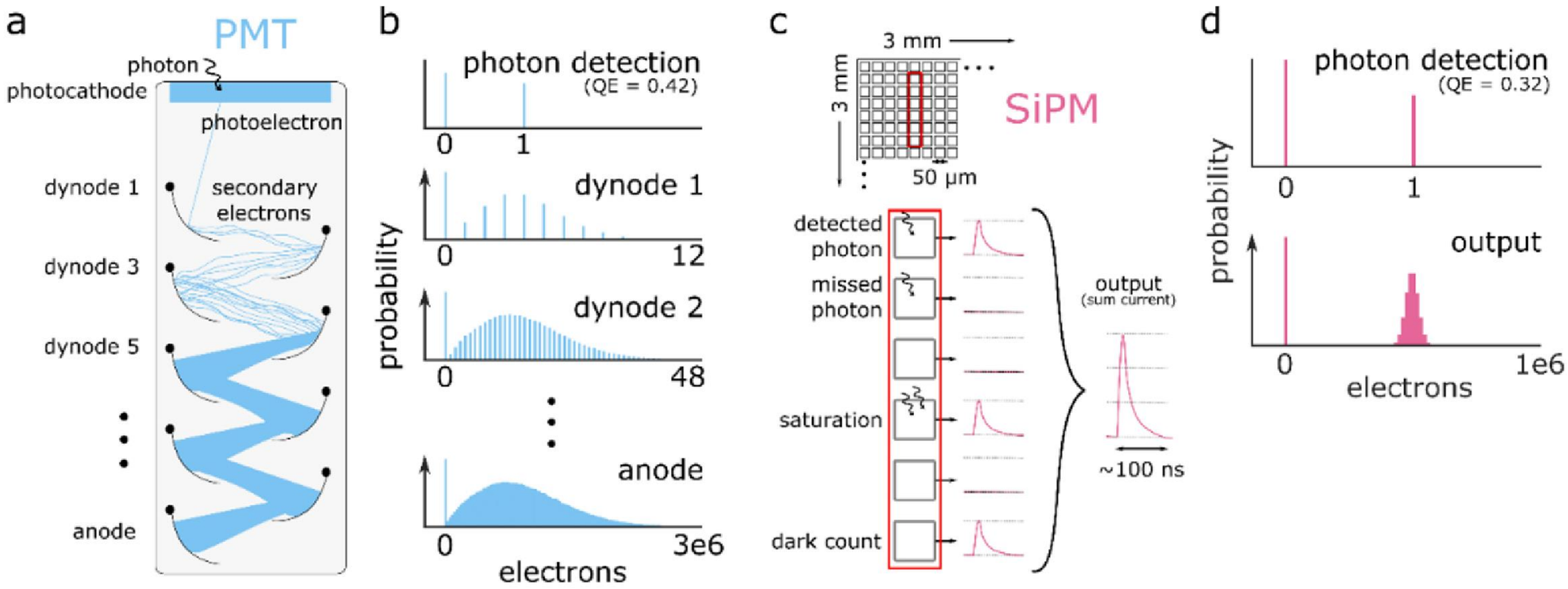


- 2 detector channels enable simultaneous two-color imaging for faster imaging, You can use different fluorophores or fluorescent labels with distinct emission spectra and simultaneously capture their signals. This is especially useful for studying multiple targets or molecules within a sample without the need for sequential imaging.

- Flexible selection of laser lines and detector type (GaAsP, PMT/MA, PMT/SIPM): The ability to choose detector type allows you to optimize SNR for your specific experimental requirements. The combination of multiple detectors and functional information allows for quantitative analysis of fluorescence intensities, emission spectra, and fluorescence lifetime measurements. This is crucial for many quantitative biology and materials science experiments.

Parameters	SiPM	GaAsP PMT	Polyalkaline PMT	Dual-alkali (Ultra bialkali) PMT
Photosentsitive Area	6mmx6mm	Ø5 mm	Ø8 mm	Ø8 mm
Spectral Response Range (nm)	200-900	300-740	185-870	230-700
Peak Response Wavelength (nm)	420	520	400	400
Dark Current nA	900	3	1	1
Peak Wavelength Detection Efficiency	38%@420nm	45%@520nm	23.87%@400nm	40.3%@400nm
Rise Time	180ps	1ns	0.57ns	0.57ns

- Advantages of SiPM detectors: Achieve higher QE and lower noise: low voltage operation, long life, wider dynamic range, insensitive to magnetic fields, suitable for high-speed high signal-to-noise ratio imaging.



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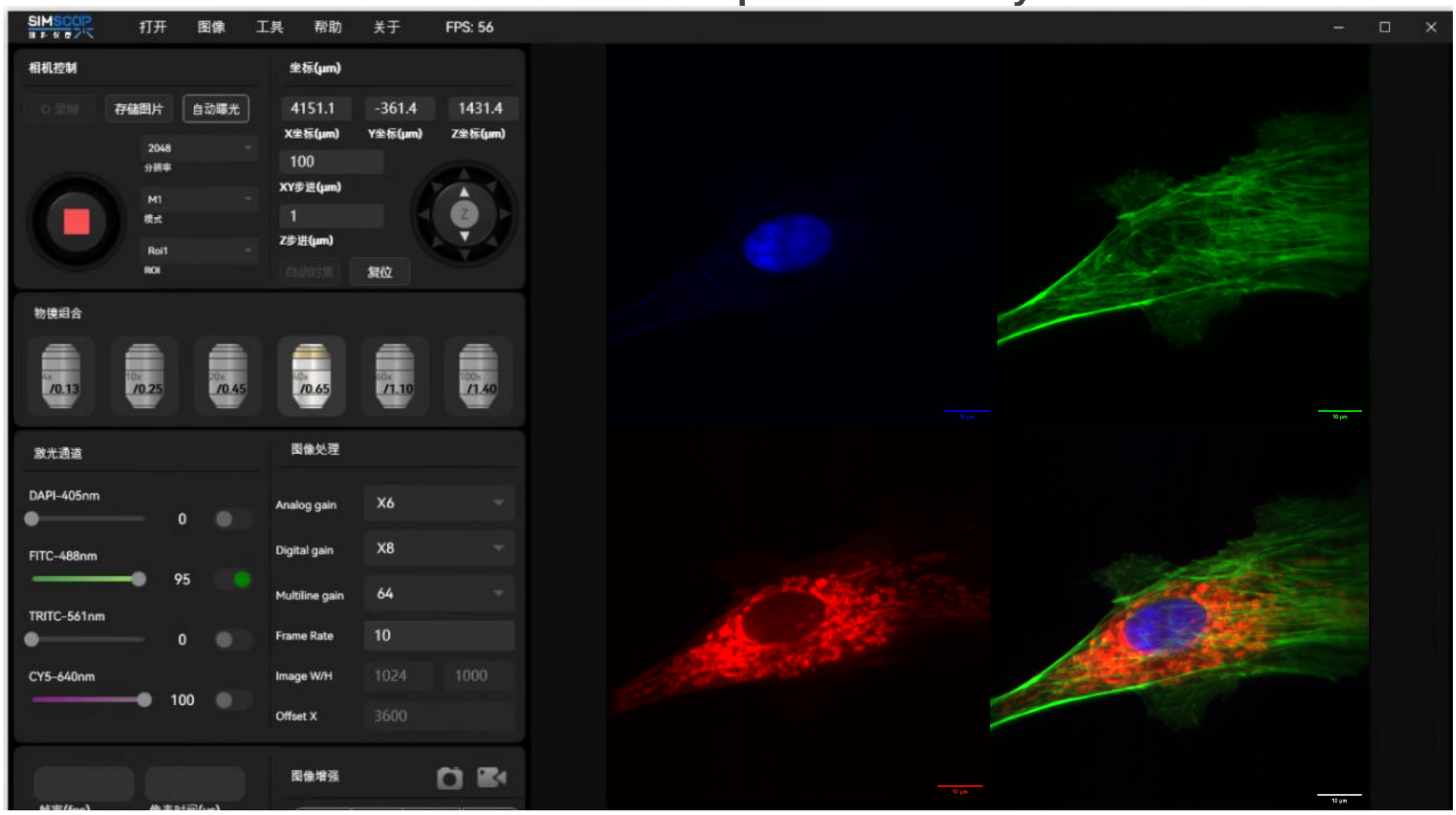
SIMSCOP - P Series Point Scan Confocal Microscope	
Laser Light Source	Standard wavelength:405±5 nm; 488nm±5nm; 561nm±1nm; 640nm±5nm Output mode:single-mode polarization-maintaining fiber (TEM00) Single wavelength output power: >20mW; Power stability: <1% Spectral linewidth: <3nm TTL modulation, 1kHz Accuracy of laser power adjustment: 0.1%; Multi-wavelength AOTF power adjustment Optional wavelengths include 375nm/ 445nm/473nm/ 515nm/525nm /532nm/633nm /660nm/ 685nm/785nm/808nm
Detectors	SiPM, 250-950nm QE＞25%@420nm, dark current: 618nA Multi-alkali PMT, 300-650nm QE>30%@500nm, dark current: 10nA GaAsP PMT,　300-740nm QE>45%@520nm, dark current: 3nA
Scan Module	Scanning pixels 128x128 ~ 4096x4096 Pixel time 0.5 μs -100 μs Maximum scanning speed: up to 8fps (512 x 512)
XY Resolution	230nm@100x Oil objective
Image Depth	＜100um
FOV	5X: 1.44mmx1.44mm ｜ 10x: 0.72mmx0.72mm ｜ 20x: 0.36mmx0.36mm, 40x: 0.18mmx0.18mm ｜ 60x: 120umx120um ｜ 100x: 72umx72um
Filter Unit	DAPI EM 445nm/50nm,　FITC EM 530nm/50nm TRITC EM 605nm/60nm,　Cy5 EM 695nm/40nm
Pinhole	16 pinhole choices; Pinhole diameter range:Ø25 μm to Ø2 mm
Eyepiece	WF10X/23 wide field eyepiece; High eye point; Centering telescope
Eyepiece Tube	45°inclined,50–75mm adjustable interpupillary distance; Adjustable diopter
Objective Converter	Converter with five-hole internal positioning ; Ball bearing for internal positioning
Stage	Manual: 240mm x 260mm fixed stage; Range of movement:135mm x 85mm Motorized: Minimum step size:50nm; Repeatability +/- 0.1 μm Maximum speed：≥100mm/s; Stage size:≥270x170mm Stroke : X:110mm,Y:75mm; Maximum load capacity >1KG (Horizontal)
Z Driver	Focusing resolution/minimum step size: 0.05μm; Repeatability: +/-0.2μm; Maximum stroke:10mm
Focusing Mechanism	Coaxial coarse/ fine adjustment with limit and locking devices, Low level coaxial focusing handwheel ; Handwheel graduations of fine adjustment:1μm
Transmitted Illumination System	Warm LED light, continuously adjustable brightness Brightness adjuster with LED rotation Condenser:72mm ultra-long working distance,NA=0.30; Equipped with a three-hole phase contrast annular plate
Epi-fluorescence Illumination System	Multi-band LED light source MG-100 6-hole fluorescence module UV(U)EX:375/30nm；　DM:415；EM:460/50nm Blue(B)EX:475/30nm；　DM:505；EM:530/40nm Yellow(Y)EX:540/25nm；DM:565；EM:605/55nm Red(R)EX:620/50nm；　DM:655；EM:692/45nm
Upgrade module (optional)	Raman confocal spectrometer Fluorescence spectrometer TCSPC NIR I/II detector
Software Feature	Multi-color fluorescence localization processing; Z-stack data processing; Large image stitching; Image analysis; Imaging data management; 3D imaging reconstruction; Spectrum analysis

SIMSCOP CM Series Confocal Microscope Software Key Features

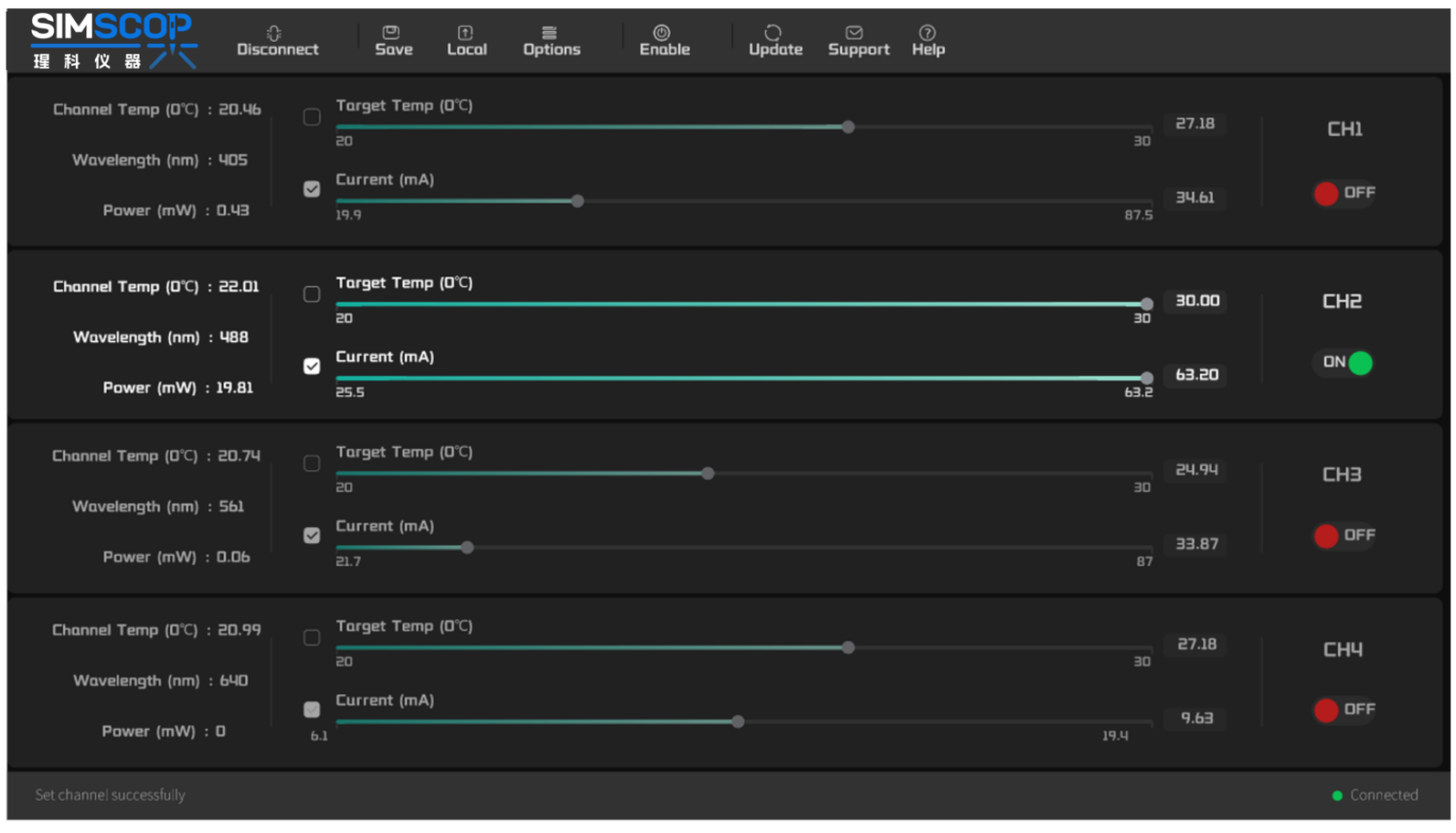


Functional GUI Panel

Easy-to-Recognize Display for Setting Lasers, Detectors, etc.

Scanning Parameter Settings of XYZ Motorized Stage

Parameter Settings of Microscope Image Acquisition



Laser Control Panel

Camera Parameter Setting

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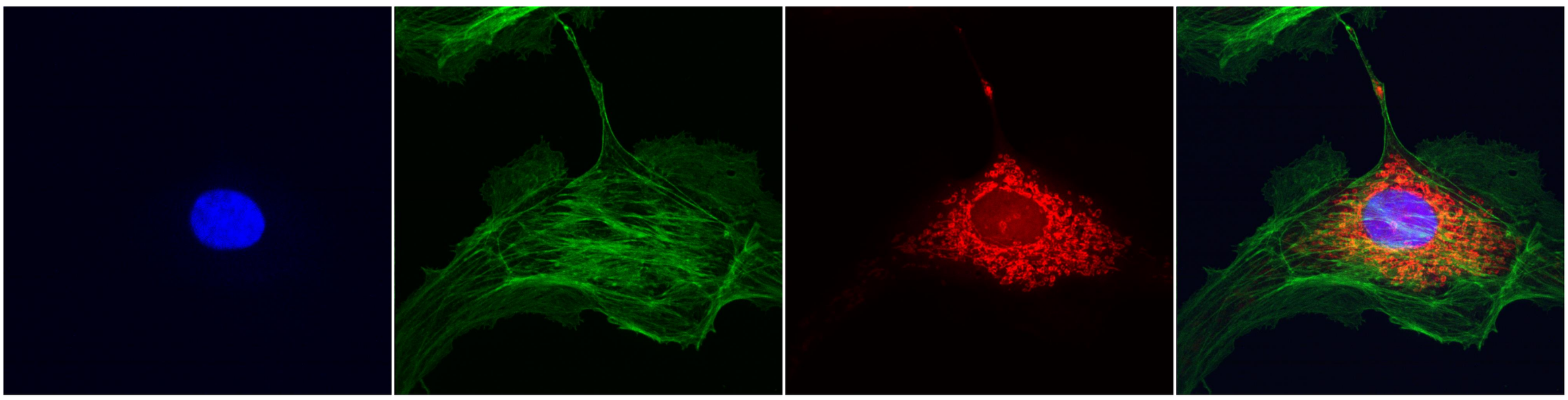
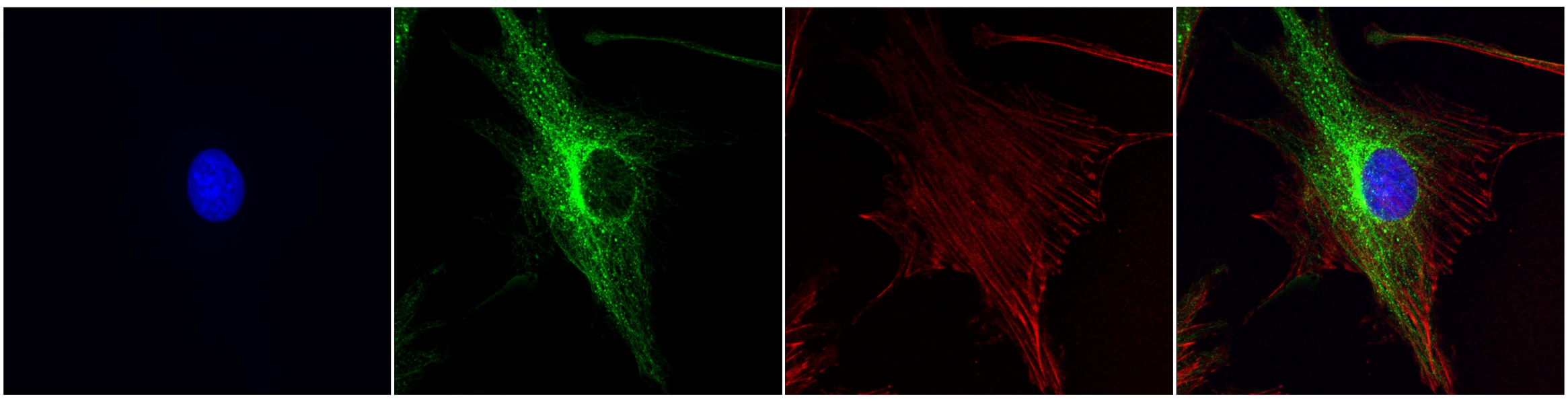
Applications

BPAE cells with MitoTracker™ Red CMXRos, Alexa Fluor™ 488 Phalloidin, and DAPI, 60X objective lens NA 1.2

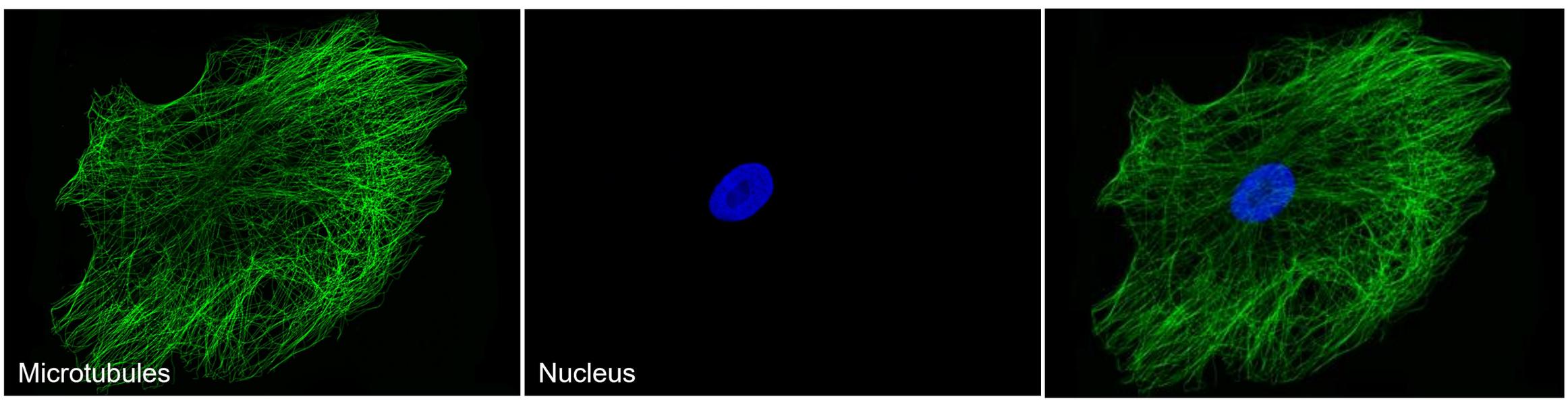


BPAE cells#1–60X–405nm | BPAE cells#1–60X–488nm | BPAE cells#1–60X–561nm | BPAE cells#1–60X–Composite

BPAE cells with Mouse Anti-α-tubulin, AlexaFluor™ 488, FL Goat Anti-Mouse IgG, Texas Red™-X Phalloidin, and DAPI, 60X objective lens NA 1.2



BPAE cells#2–60X–405nm | BPAE cells#2–60X–488nm | BPAE cells#2–60X–561nm | BPAE cells#2–60X–Composite



Shown is a confocal microscope image of a human gingival fibroblast in culture. Interphase microtubules (green) are labeled with alpha/beta-tubulin primary antibodies. FITC conjugated secondary antibody was applied afterward. Nuclear DNA (blue) was stained with Hoechst33242.

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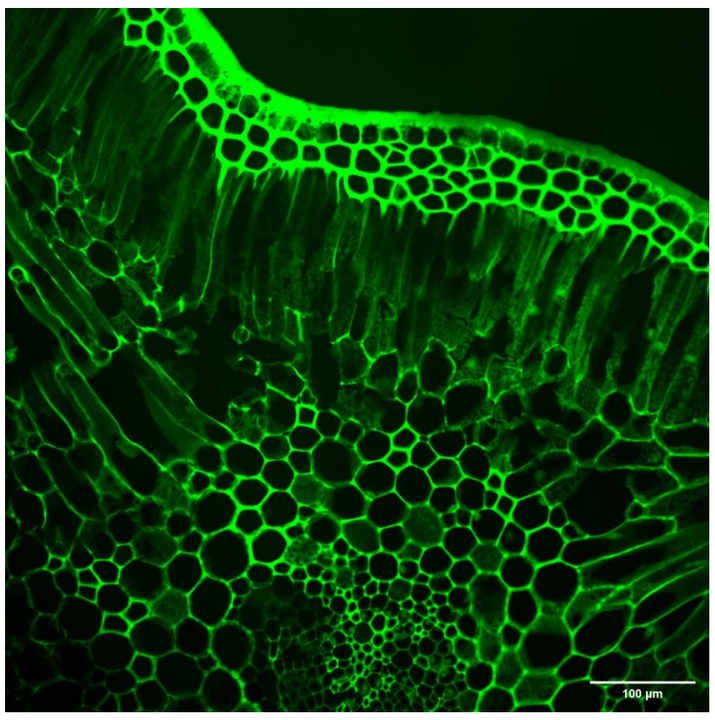
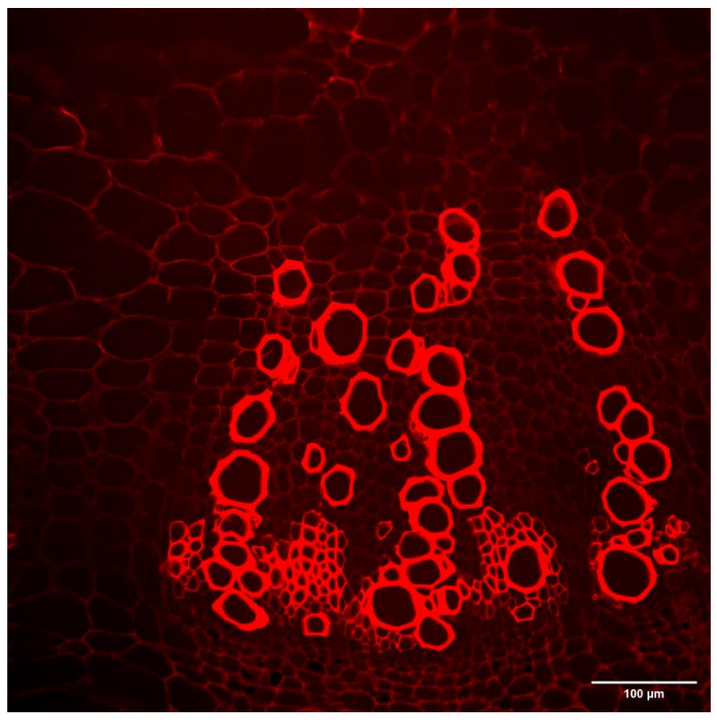
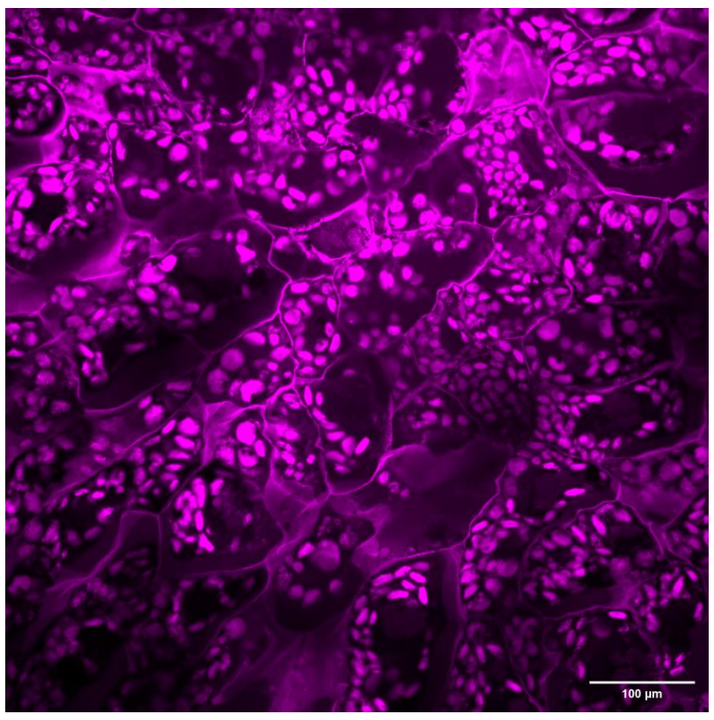


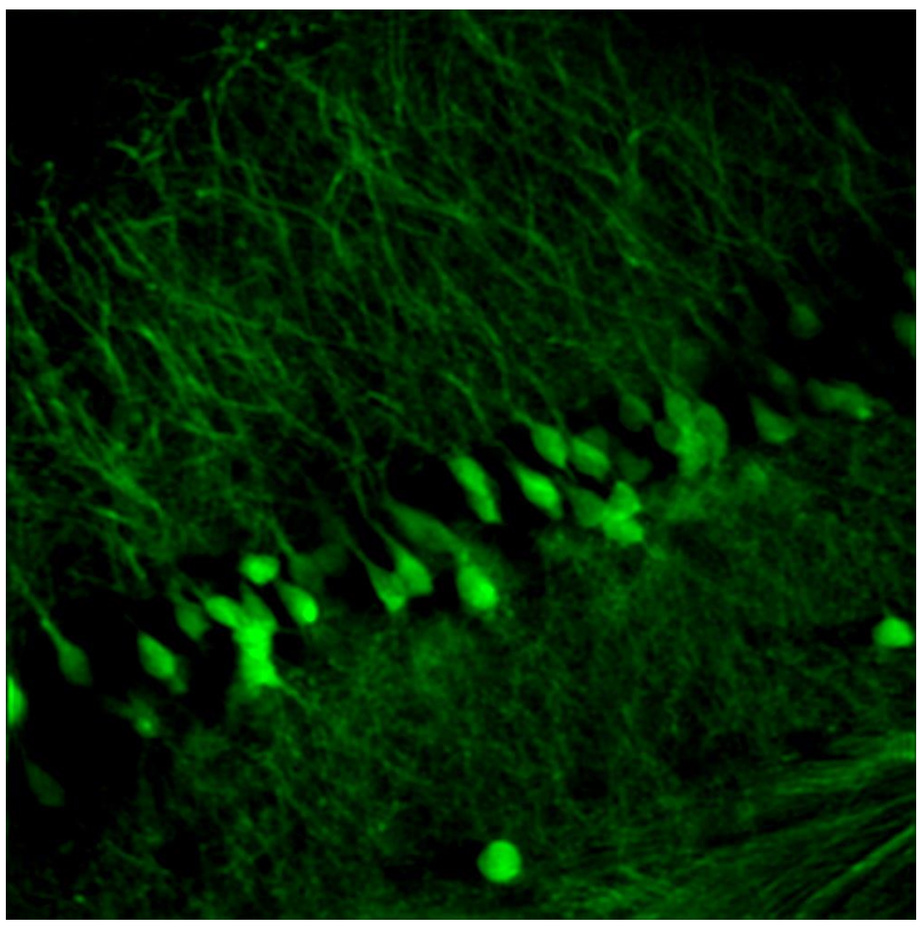
Sago palm leaf, 20X objective lens



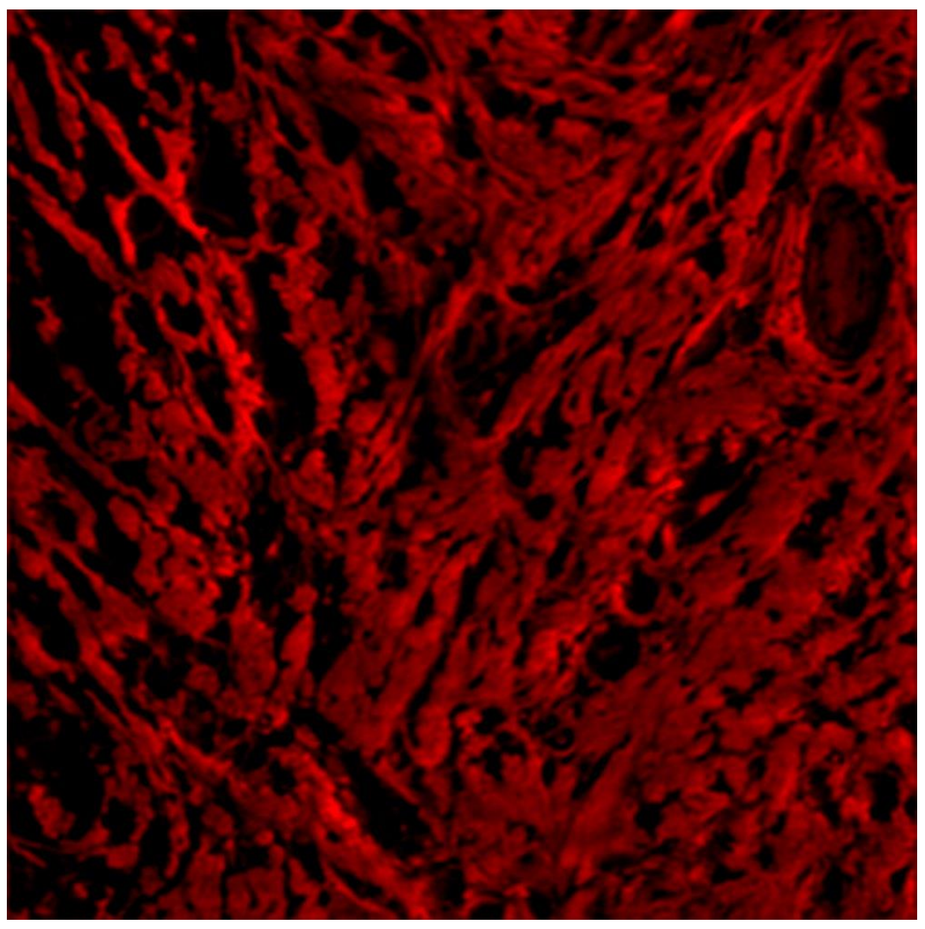
Spinach rhizome, 20X objective lens



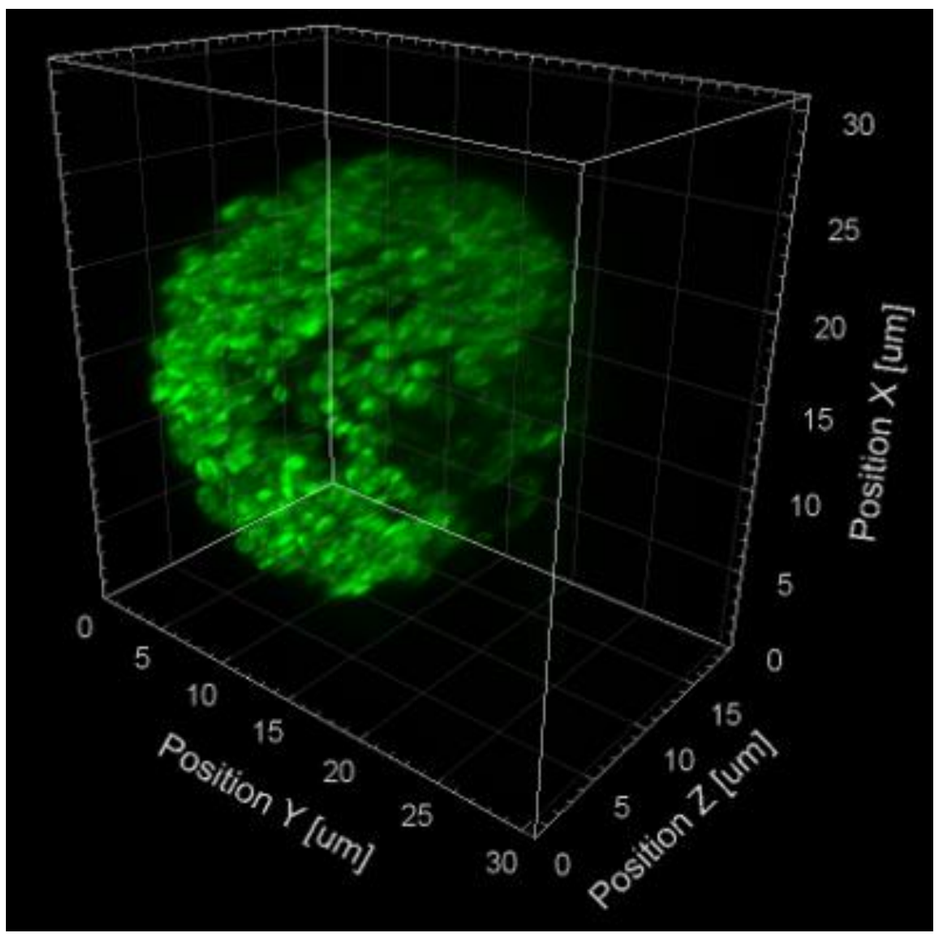
Wheat seeds, 20X objective lens



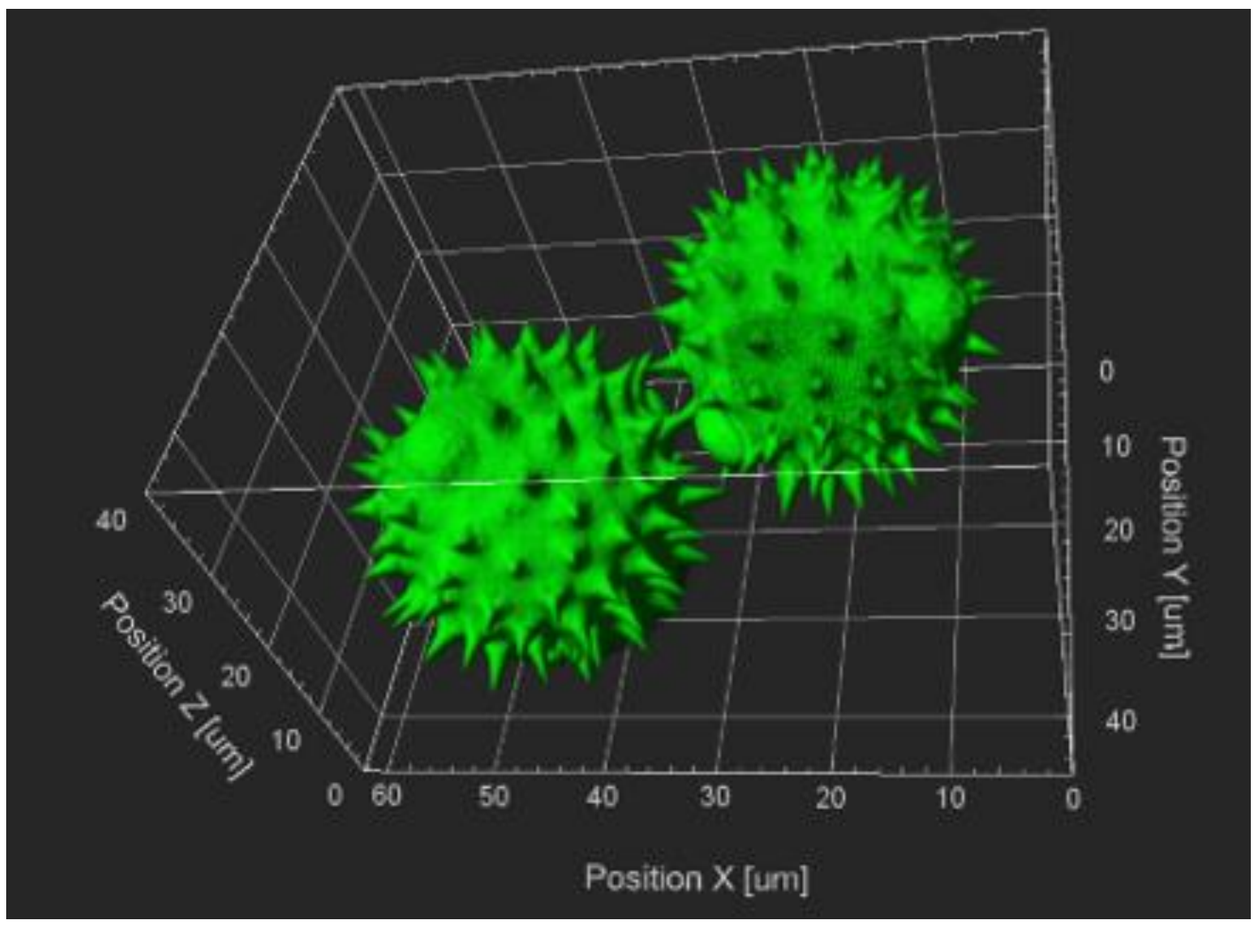
Mouse nerve, 20X objective lens,
Detector SIPM



Fibrous connective tissue section, 10X objective lens_1000x1000, Detector SIPM



Live mitotic HeLa cell treated with epsin1siRNA, DiOC6(3) to label mitotic membranes (green). Confocal images were taken at 0.118 µm steps along the Zaxis



Pollen grain-3D

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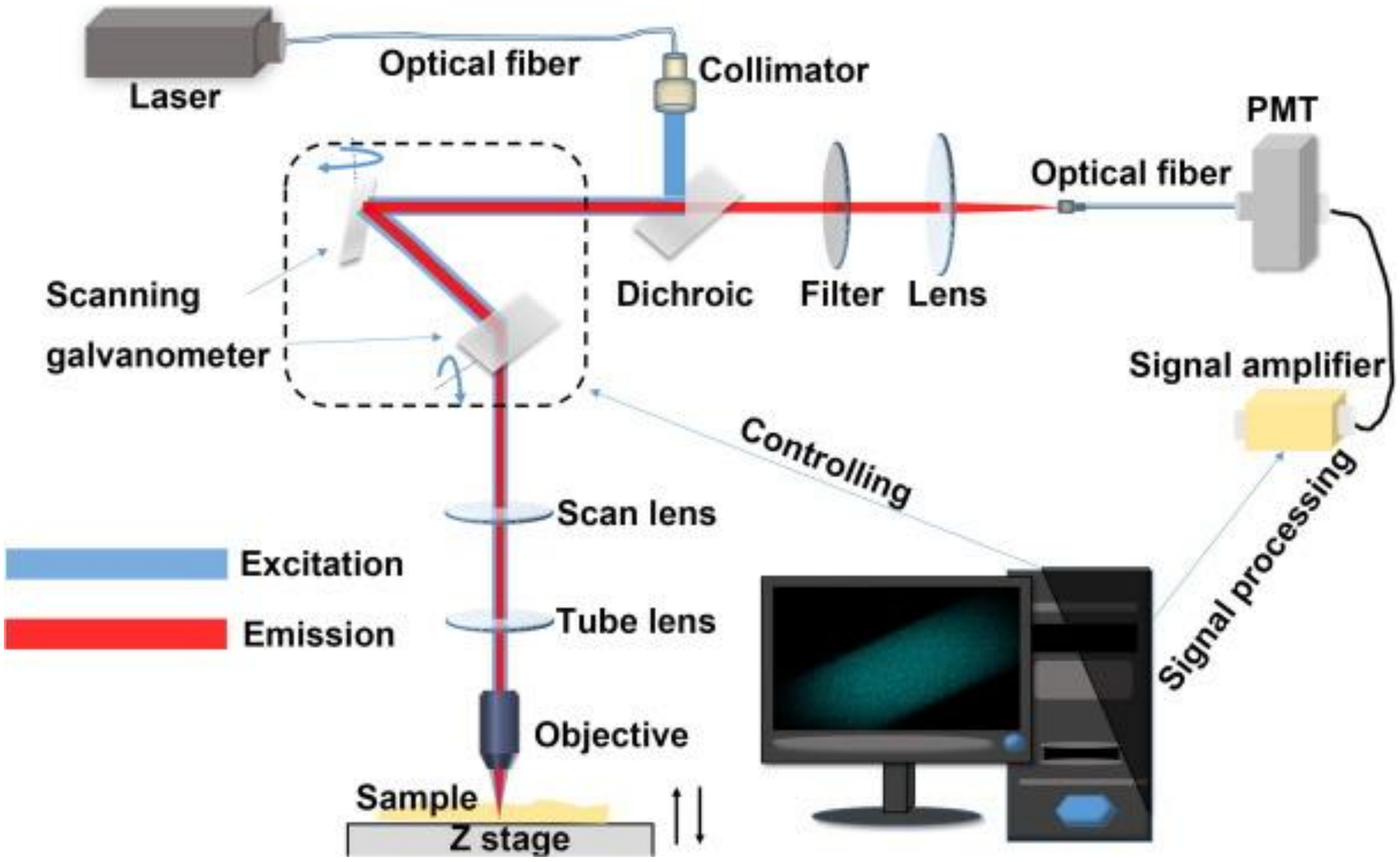
Solution One : Confocal Spectral Microscope (Near-Infrared I/II Confocal)

- Upgrade to Confocal Spectral Microscope (NIR I/II confocal)
- Wavelength Range UV to NIR (200nm-2.5nm)
- Spectral resolution up to 0.2nm
- Large NA setup for high-sensitivity application

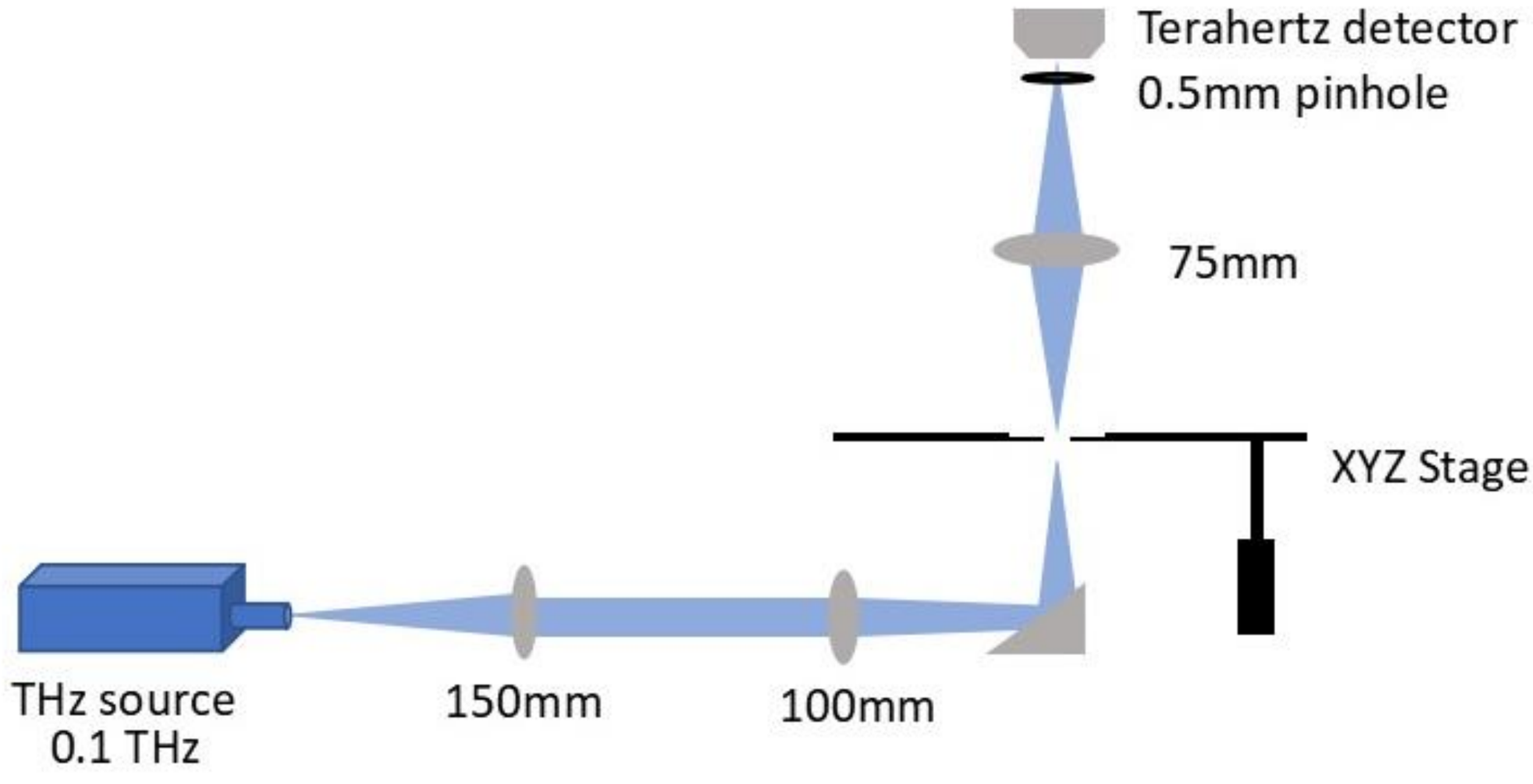


Solution Two : Terahertz Confocal Microscope System

- 100GHz,output power:80mW
- Spatial resolution 150-200um

The terahertz confocal microscope uses a focused beam of terahertz radiation to scan the sample being analyzed. This beam is then reflected back and collected by a detector, which creates an image of the sample based on the intensity of the reflected radiation. By using a confocal design, this microscope can achieve high resolution and can selectively focus on different depths within a sample.

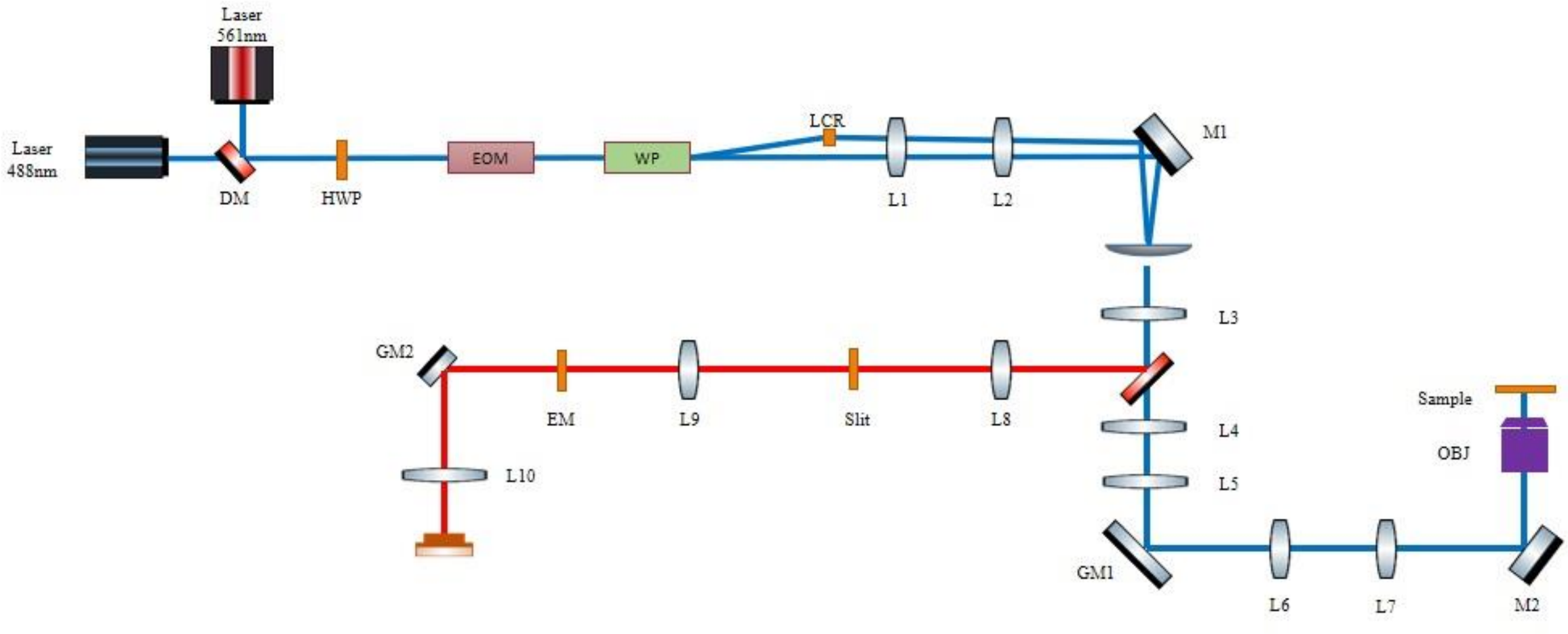
It can be used to study the microstructure and properties of materials, such as polymers, ceramics, and semiconductors, and to detect defects or anomalies in their structures. In biology and medicine, it can be used to image and study biological tissues, including skin, teeth, and cartilage, which are transparent to terahertz radiation.



● Solution Three: Super Resolution Confocal Re-scan Structure Illumination Microscope

A "re-scan" confocal microscope is a type of confocal microscope that uses a rapidly moving mirror or scanner to scan across the sample multiple times, producing even higher resolution and better contrast images than standard confocal microscopes.

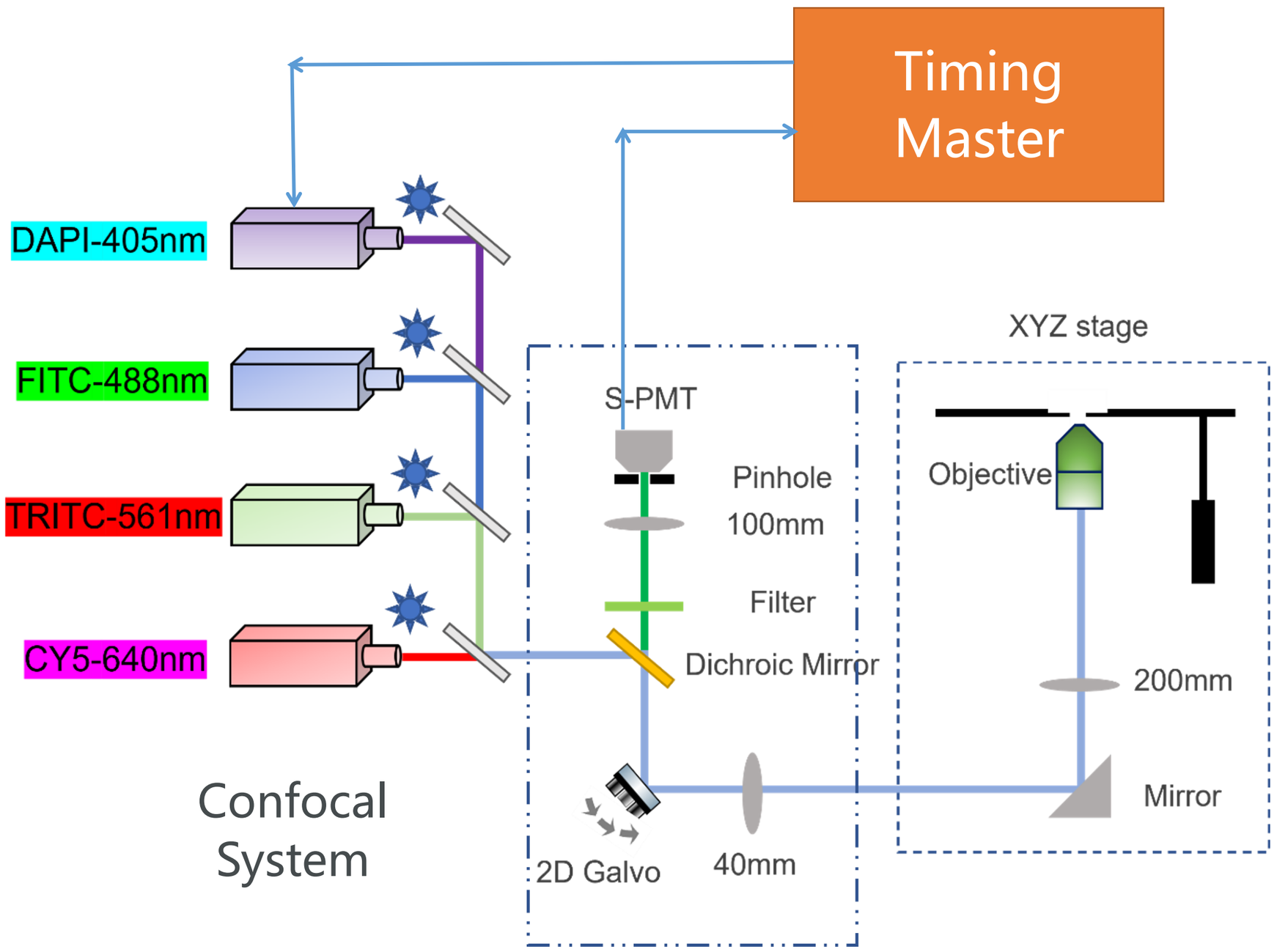
Overall, re-scan confocal microscopes are very powerful tools for studying biological tissues, cells, and other samples, and are widely used in research labs, medical facilities, and other scientific settings.



● Solution Four: Fluorescence Lifetime Imaging Microscopy (FLIM)

FLIM is a type of microscope that allows visualization and analysis of biological samples based on the fluorescence lifetime of the fluorophore being used. FLIM measures the time between the excitation and emission of photons in a sample, which can provide information about the properties of the fluorophore and the environment in which it is located.

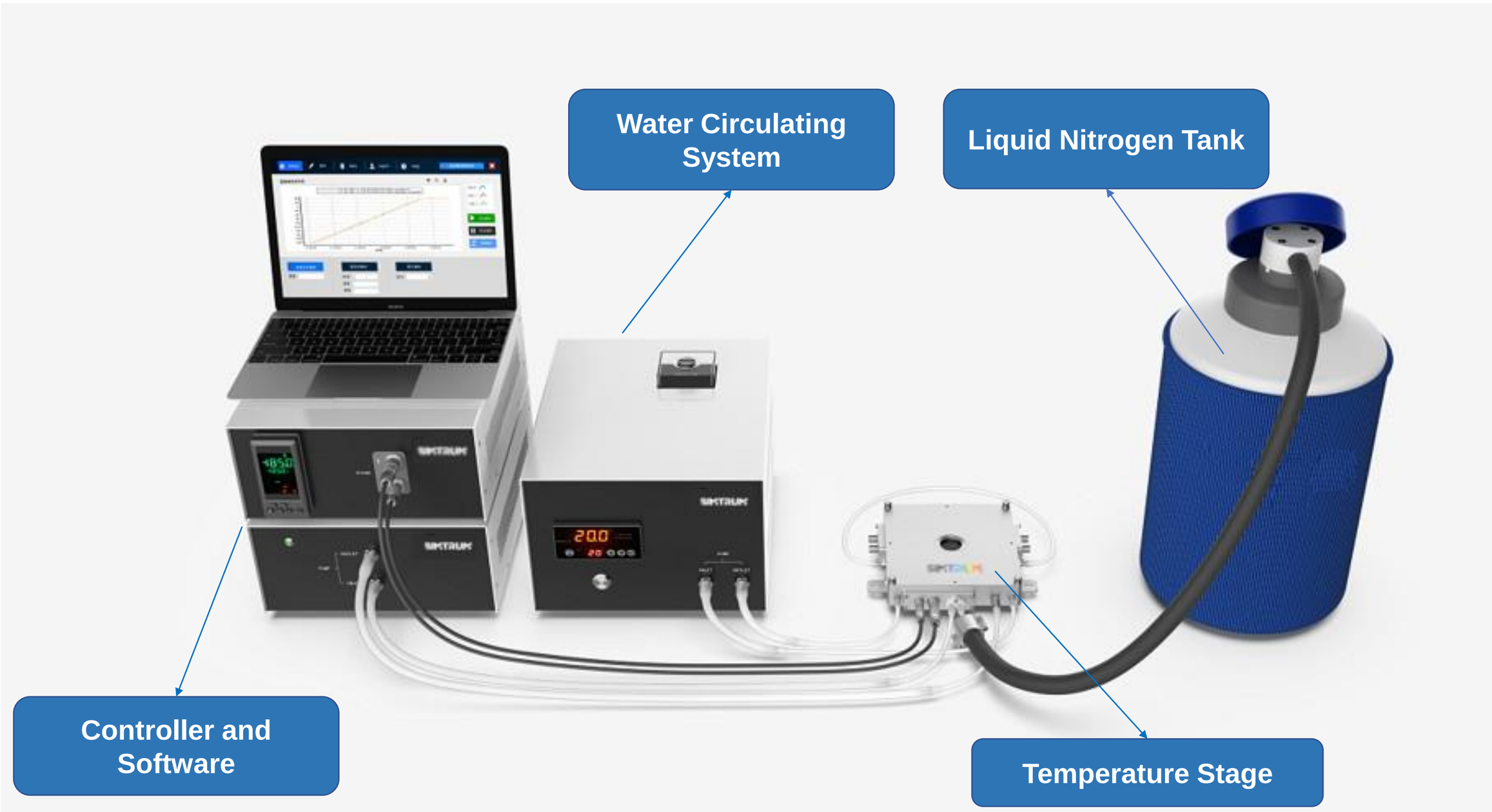
FLIM can be used to study a wide range of biological processes, including protein-protein interactions, enzyme activity, and ion concentration changes. It is often used in combination with other imaging techniques, such as confocal microscopy, to provide more detailed information about the sample.



Solution Five : Low Temperature Confocal Microscope

Compatible with SIMTRUM Cryostat to perform Low-temperature Raman measurements -190 to 600 degrees

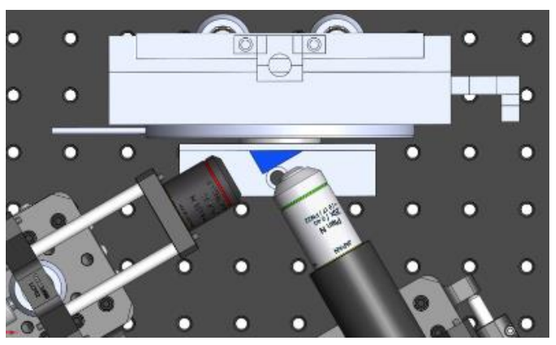
- 8 probe arms able to upgrade to adjustable probe arm
- Reflection or transmission mode available

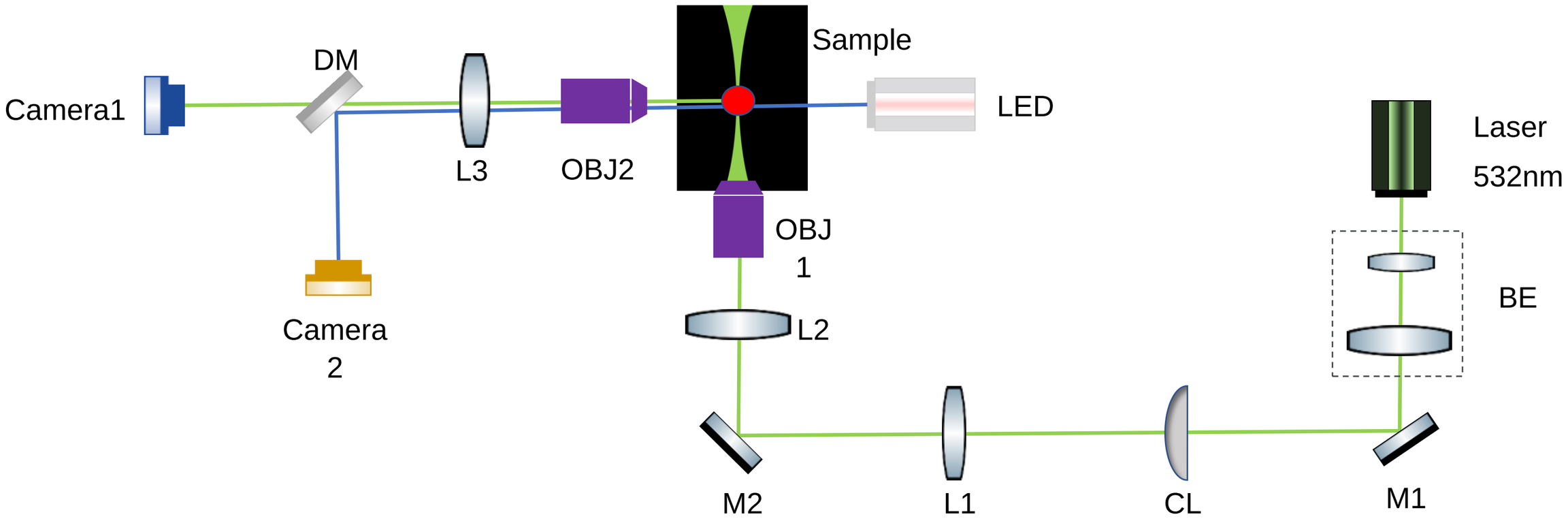


Solution Six: Light Sheet Microscope

The working principle of LSM involves separating the illumination and detection paths into two orthogonal planes. The illumination plane is a thin sheet of light produced using a laser or LED light source and a cylindrical lens. This sheet of light then scans through the sample, illuminating only a thin slice of the sample at a time. The light emitted by the sample is then detected by a camera or photomultiplier tube positioned perpendicular to the illumination. It allows for rapid, high-resolution imaging of three-dimensional (3D) structures within living organisms while minimizing light damage.

LSM has a wide range of applications in biological research, including the study of embryonic development, neural circuits, and the response of cells and tissues to stimuli. They are also used for imaging of entire organisms, such as zebrafish embryos and fruit fly larvae, to gain deeper insights into their behavior.

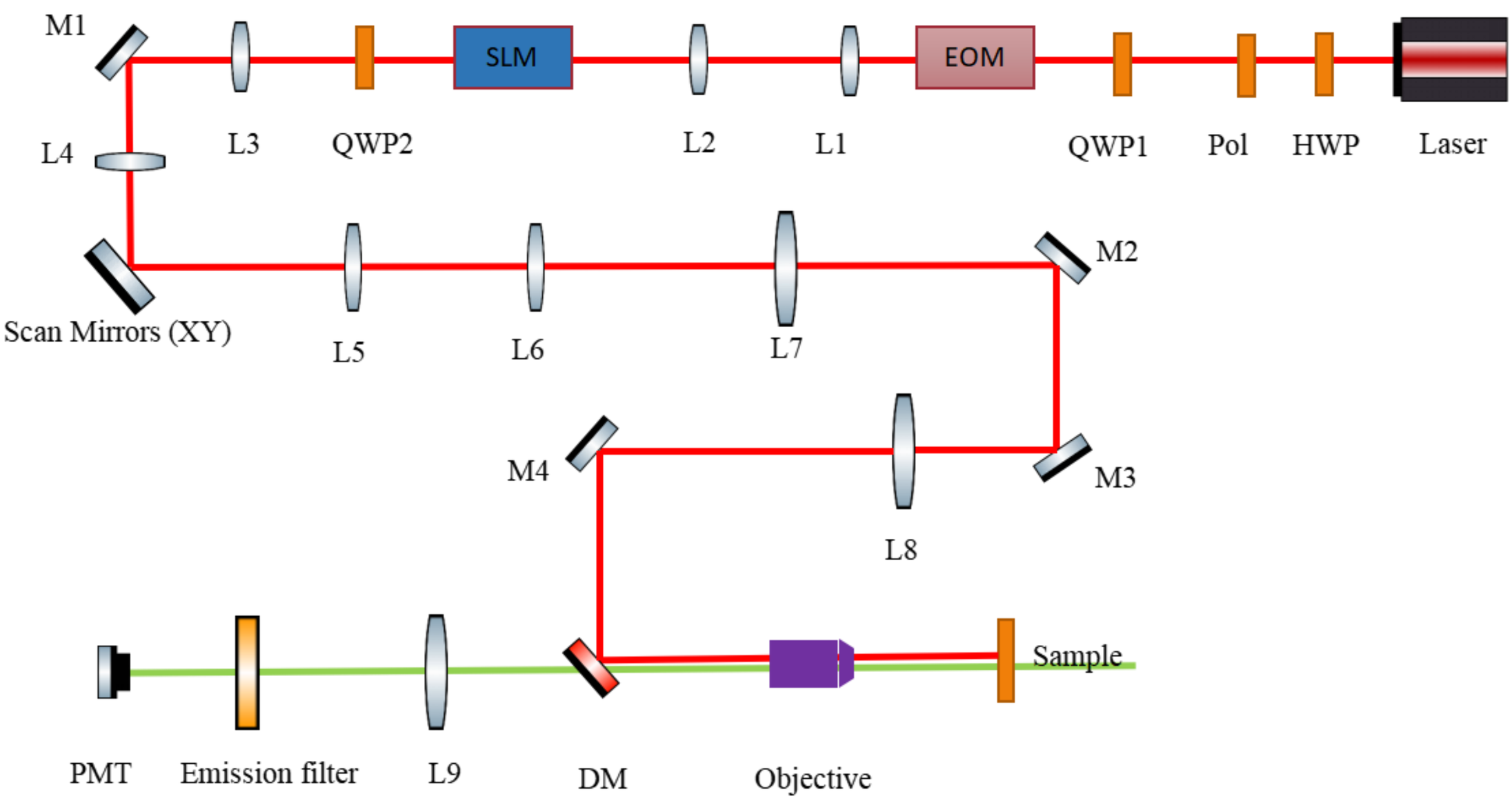




● Solution Seven：Single / Two /Multi Photon Microscope

In two-photon microscope, a laser emits light at a specific wavelength that is absorbed by the fluorescent molecules in the sample. When two photons of this light are absorbed simultaneously, they provide enough energy to excite the fluorescent molecule and cause it to emit light at a longer wavelength, which can be detected by the microscope. Because two photons are required to excite the molecule, the probability of fluorescence emission is low and only occurs at the focal point of the microscope, allowing for high-resolution imaging and greater depth than conventional microscopes.

Two-photon microscope has a number of applications in neuroscience, biology, and biomedical imaging. For example, it has been used to study the activity of individual neurons in the brain, to visualize the structure and function of blood vessels, and to track the behavior of cells in living tissues.



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