

## Multi-Line CW Multi-Mode Laser



**2024 V1**

For customized projects please Contact us:

[info@simtrum.com](mailto:info@simtrum.com)

The **Multi-channel CW Multi-Mode lasers (4-in-1 lasers)** include four different wavelengths (405nm/488nm/525nm/628nm) that integrate a laser diode, laser cavity, fiber-coupled optics, laser power supply, and LD current. It is designed for laser scanning confocal microscopy systems.

The 4-in-1 laser in a laser scanning confocal microscope system is a special laser system used in biomedical research and clinical applications. It combines four different wavelengths of lasers to provide a variety of excitation light sources. Laser scanning confocal microscopy is a high-resolution microscopy technique that obtains three-dimensional images of cells and tissues by scanning and focusing with a laser beam. The 4-in-1 laser provides different wavelengths of laser light to a laser scanning confocal microscope system to excite different fluorochromes or labels, allowing samples to be observed and studied under the microscope.



Different wavelengths of lasers can interact with different fluorochromes or markers, enabling the visualization and localization of different cellular and molecular structures. For example, the 405nm laser is typically used to excite UV dyes, 488nm is used for fluorescein and green fluorescent proteins, the 525nm laser is used for yellow fluorescent proteins and red fluorescent dyes, and the 640nm laser is used for fluorescent proteins and infrared dyes.

The advantage of the 4-in-1 laser system is that it provides a multi-wavelength laser light source that can excite multiple fluorochromes or labels at the same time, providing a more comprehensive picture in a single experiment. This has important implications for multicolor fluorescence imaging, colocalization, and co-expression studies of cells and tissues.

## Features

- **Multi-wavelength output**

Multi-wavelength single-mode lasers can provide four different wavelengths of laser light sources. This makes it suitable for observing and analyzing the fluorescence signals of multiple markers or samples at the same time, improving experimental efficiency and data accuracy.

- **High-quality spectrum**

The laser light source of this laser system has a narrow spectral width and high spectral quality, which is conducive to reducing the interference of stray light of the light source and providing clear images and accurate signals.

- **Multi-mode output**

The laser system uses a multi-mode fiber output with good pattern quality and beam quality. This makes it suitable for high-resolution imaging, high-precision measurements, and other applications that require high beam quality.

- **High power stability**

The laser system has a high power output and excellent power stability. In the process of long-term experiments and data acquisition, the required laser power can be stably output, which ensures the reliability and consistency of experimental results.

- **Adjustable power**

The user can flexibly adjust the laser power according to the experimental needs and sample characteristics. This helps to avoid sample damage or overexposure while achieving the best image quality and signal intensity.

## Application

- **Imaging and Localization of Cell**

Using the different wavelength lasers provided by the four-in-one laser, the position and distribution of cell organelles such as the nucleus, mitochondria, and Golgi apparatus can be labeled and observed, which help to study cell function and interactions.

- **Fluorescence Co-expression Studies**

Using the different wavelength lasers provided by the four-in-one laser, the fluorescence signals of multiple markers can be simultaneously observed and analyzed to understand their co-localization and co-expression in cells or tissues.

- **Imaging of Neuronal Activity**

Using the laser light source provided by the four-in-one laser to excite specific fluorescent markers in neurons, such as calcium indicators, neuronal excitability and synaptic transmission processes can be observed and recorded through laser confocal microscope.

- **Drug Screening and Evaluation**

In cell culture models, the laser light source provided by the four-in-one laser can be used to observe and analyze changes in cell morphology and structure to evaluate the effects and efficacy of drugs on cells.

- **Histopathological Analysis**

Using the laser light source provided by the four-in-one laser, the details of cell structures, pathological changes and tumor metastasis in tissue samples can be observed and analyzed, providing pathologists with more accurate diagnostic and treatment decision-making basis.

## Specification

Parameter	ST4LM
Wavelength	405/488/525/638nm
Center wavelength	±5 nm
Output Power	> 500mw
Output Mode	SMA905, Core 400um, 0.39NA, Armor Fiber
Laser Type	CW laser
Monochromacies	<10 nm
Power Stability	<2%
Laser Power Adjustment Accuracy	0.01
Models	Optoelectronic all-in-one machine
Software Control	RS232
Software SDK	Support secondary development of SDK or serial port protocol. Provided operating software, SDKs, dependency libraries, etc

## Control Panel



Laser power supply rear panel

Number	Definition	Function
1	Optical Fiber	Laser transmission fiber, transmit laser power
2	100-240VAC	AC signal input
3	SIGNAL IN	Signal input (BNC cable) Pin definition: the inner core signal is positive, and the outer layer is negative
4	Fan	Heat dissipation inside the power supply
5	485 communication protocol	The laser output is controlled by the protocol
6	Switch	Control the power on and off



Description of the interface function

Number	Definition	Function
1	Display screen	Displays the current current
2	Potentiometer	Rotate to adjust the current size, the clockwise current increases, and the counterclockwise current decreases
3	Status display light	When the power is turned on, the blue indicator "Power" is on, and the laser is working normally, and the red alarm indicator "Alarm" is on.
4	Key switches	Control the laser to emit light, the key is turned to "ON", adjust the potentiometer laser to emit light, and the key is turned to "OFF", the laser stops emitting light