

# Fiber-Coupled LED



One Platform Many Possibilities

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## Venuslab™ Intelligent Benchtop Fiber-Coupled LED System

The Venuslab™ Series Fiber-Coupled LED Light Source is a "turnkey" optoelectronic solution engineered specifically for precision optical experiments and industrial online inspection.

This system overcomes the limitations of traditional discrete LED components—such as complex setup, difficult thermal management, and tedious optical alignment—by integrating high-performance LED chips, precision optical coupling modules, intelligent driver circuits, and an active thermal management system into a compact, ruggedized benchtop enclosure. Users require no complex optical alignment experience; simply connecting a fiber via the standard SMA905 interface delivers a monochromatic light output that is highly stable, pure, and uniform.

Venuslab™ offers an exceptionally wide range of wavelength options, spanning from Deep Ultraviolet (280nm) to Short-Wave Infrared (1450nm), covering over 30 specific center-wavelength models. Whether it is 280nm UV light for DNA analysis, 470nm blue light for optogenetics, or 1300nm/1550nm infrared light for telecom testing, users can find the corresponding light source module on a single platform. The standardized SMA905 fiber interface is compatible with the vast majority of multimode fibers and spectrometers on the market. Additionally, customization for FC, ST, and other interfaces is supported, ensuring seamless integration with existing experimental equipment.

### Core Technical Advantages

**Superior Power Stability & Thermal Management:** The source features an internal silent fan paired with a high-efficiency thermal module, ensuring the LED junction temperature remains within the optimal operating range. This active thermal management design effectively suppresses wavelength drift (Red-shift) and power degradation (Thermal Droop) caused by heat, enabling the source to perform continuous tasks for thousands of hours.

**Intelligent Dual-Mode Driver Architecture:** The system supports both Continuous Wave (CW) and External Trigger modes. In CW mode, it provides extremely stable constant intensity. In External Trigger mode, users can control the LED via TTL signals, precisely adjusting the operating frequency, intensity ratio, and duty cycle, making it perfectly suited for lock-in amplifier detection or time-resolved spectroscopy experiments.

**Precise Linear Dimming:** The front panel is equipped with a digital display and a multi-turn precision potentiometer, allowing users to perform continuous linear adjustment of the output intensity from 0 to 100%, achieving fine control of optical power down to the microwatt ( $\mu\text{W}$ ) level.

### Detailed Applications

**1. Neural Activation/Inhibition:** 470nm (Blue) and 590nm (Amber) models are widely used to activate ChR2 or NpHR for precise control of neural circuits. The pulse mode perfectly simulates neuronal firing frequencies.

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**2.UV Curing & Catalysis:**High-energy UV models (365/385/395nm) are suitable for UV adhesive curing and photocatalysis research.

**3.Detector Response Testing:**Provides monochromatic light from Deep UV to SWIR for calibrating the spectral response curves of photodiodes and cameras.

**4.Stroboscopic Illumination:**Uses external trigger mode to synchronize with camera shutters for stroboscopic lighting on high-speed production lines.

## Interface & Operation Guide

### Optical Interface (Light Output):

**Standard:** The device comes with a default SMA905 interface (Universal standard for industry and laboratories), compatible with Multimode Fibers (MMF) having a Numerical Aperture (NA) of 0.22 or greater.

**Customization:** Optional FC/PC or ST interfaces are available upon request to match specific existing optical systems.

### Front Panel Controls:

**Digital Display:** A 3-digit LED screen that provides a real-time readout of the current optical power output percentage (0-100).

**Adjustment Knob:** A multi-turn precision potentiometer allowing for fine, linear adjustment of light intensity. This ensures smooth dimming without stepping artifacts.

**Mode Switch:** A toggle switch to select between CW Mode (Continuous Wave / Internal Control) and EXT Mode (External Trigger / Pulse Control).

### Operational Modes:

**CW Mode (Continuous Wave):** The LED outputs a stable, continuous beam. Intensity is controlled solely by the front panel knob.

**External Trigger Mode:** The LED output is controlled by an external signal (typically TTL). This allows the user to modulate the operating frequency, intensity ratio, and duty cycle via an external function generator or microcontroller, enabling synchronized stroboscopic illumination or pulse modulation.

## Venuslab™ Series - Fiber Coupled LED Specifications

Model Name	Wavelength	Power Output (approx.)	Spectral FWHM (Line Width)	Interface
VL-FC-280	280 nm	2 mW	15 nm	SMA905/FC
VL-FC-308	308 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-325	325 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-340	340 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-365	365 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-375	375 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-385	385 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-395	395 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-405	405 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-415	415 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-430	430 nm	0.5 mW	15 nm	SMA905/FC
VL-FC-455	455 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-470	470 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-490	490 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-505	505 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-530	530 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-554	554 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-565	565 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-590	590 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-595	595 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-617	617 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-625	625 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-660	660 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-680	680 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-700	700 nm	8.5 mW	15 nm	SMA905/FC
VL-FC-740	740 nm	9 mW	15 nm	SMA905/FC
VL-FC-780	780 nm	9 mW	15 nm	SMA905/FC
VL-FC-810	810 nm	9 mW	15 nm	SMA905/FC
VL-FC-850	850 nm	9 mW	15 nm	SMA905/FC
VL-FC-880	880 nm	9 mW	15 nm	SMA905/FC
VL-FC-940	940 nm	9 mW	15 nm	SMA905/FC
VL-FC-970	970 nm	9 mW	15 nm	SMA905/FC
VL-FC-1060	1050/1060 nm	9 mW	15 nm	SMA905/FC
VL-FC-1100	1100 nm	9 mW	15 nm	SMA905/FC
VL-FC-1200	1200 nm	9 mW	15 nm	SMA905/FC
VL-FC-1300	1300 nm	9 mW	15 nm	SMA905/FC
VL-FC-1450	1450 nm	9 mW	15 nm	SMA905/FC

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