

# LASER WAVELENGTH METER

780.024 nm



# 521 Series

*A Low-Priced Alternative  
For Accurate Laser  
Wavelength Measurement.*

The **521 Series Laser Wavelength Meter** from Bristol Instruments is for scientists and engineers who need to know the absolute wavelength of their CW laser, but do not need to know it to the highest accuracy available. The 521 system is a unique instrument that couples accurate laser wavelength measurement and affordability in a compact system.

### **Proven interferometer technology**

The 521 Laser Wavelength Meter measures absolute wavelength of CW and quasi-CW lasers to an accuracy of  $\pm 10$  parts per million ( $\pm 0.01$  nm at 1000 nm). This system uses Michelson interferometer-based technology that is similar to that used by the Bristol Instruments' model 621, the most precise laser wavelength meter available. The primary difference is that a Moiré scale is used as its built-in reference. This high-resolution scale provides the continuous calibration that is necessary to guarantee the accuracy of the wavelength measurement. For even greater confidence, the Moiré scale can be calibrated periodically using a simple procedure with any red HeNe laser input.

### **Broad wavelength coverage**

Two versions of the 521 Laser Wavelength Meter are available to satisfy the needs of most experiments. The 521-VIS operates over the wavelength range of 400 to 1100 nm, and the 521-NIR has an operational wavelength range of 520 to 1700 nm.

### **Straightforward operation**

The 521 Laser Wavelength Meter operates with a PC, running under Windows, via a USB interface. Software is provided to control measurement parameters and to report data, or the system can become part of an experiment using a library of commands for custom or LabVIEW programming. The laser under test enters the 521 system through a pre-aligned fiber-optic input connector to ensure optimum alignment. For free-beam lasers, the LC-1 Fiber-Optic Input Coupler is offered as a simple way to launch into fiber.

## FEATURES

- Absolute wavelength measured to an accuracy as high as  $\pm 0.005$  nm
- Continuous calibration with a built-in wavelength reference
- Operation available from 400 nm to 1.7  $\mu\text{m}$
- Input power requirement as low as 5  $\mu\text{W}$
- Measurement rate of 10 Hz
- Convenient, pre-aligned fiber-optic input
- Integrates into experiment for automatic wavelength reporting and control



**The Power of Precision**

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# SPECIFICATIONS

	521-VIS		521-NIR	
<b>LASER TYPE</b>	CW and quasi-CW (repetition rate >10 MHz)			
<b>WAVELENGTH</b>				
Range	400 - 1100 nm		520 - 1700 nm	
Absolute Accuracy <sup>1</sup>	$\pm 10$ ppm $\pm 0.01$ nm @ 1000 nm $\pm 0.1$ cm <sup>-1</sup> @ 10,000 cm <sup>-1</sup> $\pm 3.0$ GHz @ 300,000 GHz			
Repeatability <sup>2, 3</sup>	$\pm 5$ ppm ( $\pm 0.005$ nm @ 1000 nm)			
Calibration <sup>4</sup>	Continuous - built-in Moiré scale			
Display Resolution	6 digits			
Units	nm or cm <sup>-1</sup> (vacuum), GHz			
<b>OPTICAL INPUT SIGNAL</b>				
Maximum Bandwidth <sup>5</sup>	100 GHz			
Minimum Input <sup>6</sup>	VIS	10 $\mu$ W (400 nm)	5 $\mu$ W (750 nm)	35 $\mu$ W (1100 nm)
	NIR	100 $\mu$ W (520 nm)	5 $\mu$ W (1100 nm)	20 $\mu$ W (1700 nm)
<b>MEASUREMENT RATE</b>	10 Hz			
<b>INPUTS/OUTPUTS</b>				
Optical Input	Pre-aligned FC/UPC connector (9/125 $\mu$ m core diameter) - optional free beam-to-fiber coupler			
Instrument Interface	High-speed USB 2.0 interface with Windows-based display program Library of commands for custom and LabVIEW programming			
<b>COMPUTER REQUIREMENTS</b>	PC running Windows 7, Vista, or XP with 1 GHz or higher microprocessor, at least 1 GB of available RAM, USB 1.1/2.0 port, monitor (resolution 1200x800 or greater), mouse or other pointing device			
<b>ENVIRONMENTAL</b> <sup>7</sup>				
Warm-Up Time	None			
Temperature	+15°C to +30°C (-10°C to +70°C storage)			
Pressure	500 - 900 mm Hg			
Humidity	$\leq 90\%$ R.H. at + 40°C (no condensation)			
<b>DIMENSIONS AND WEIGHT</b>				
Dimensions (H x W x L)	2.5" x 5.5" x 9.0" (64 mm x 140 mm x 229 mm)			
Weight	3.5 lbs (1.6 kg)			
<b>POWER REQUIREMENTS</b>	90 - 264 VAC, 47 - 63 Hz, 15 VA max			

- (1) Confidence level of 3 $\sigma$  ( $\geq 99.6\%$ ) and traceable to accepted physical standards.
- (2) Standard deviation for a 5 minute measurement period after the instrument has reached thermal equilibrium.
- (3) Wavelength resolution is approximately two times repeatability.
- (4) The Moiré scale should be calibrated periodically using a standard red HeNe laser.
- (5) Bandwidth is FWHM. When bandwidth is greater, wavelength accuracy is reduced.
- (6) Sensitivity at other wavelengths can be determined from a graph that is available upon request.
- (7) Typical.



Bristol Instruments reserves the right to change the detail specifications as may be required to permit improvements in the design of its products. Specifications are subject to change without notice.