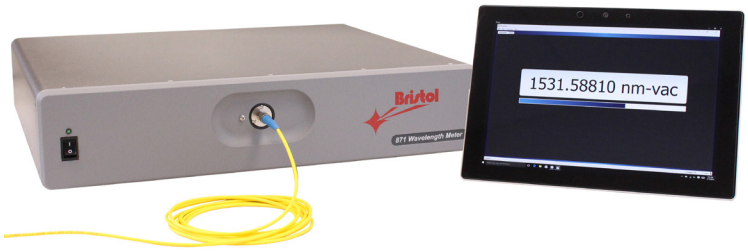
Bristol Instruments

871 Series

LASER WAVELENGTH METER



The fastest and most reliable method to measure the wavelength of pulsed and CW lasers.

The 871 Laser Wavelength Meter measures the absolute wavelength of pulsed and CW lasers with the reliable accuracy necessary to ensure the most meaningful experimental results. What's more, an unsurpassed sustained measurement rate enables the wavelength characterization of all laser pulses, and its time resolution provides the most detailed wavelength analysis of tunable lasers.

Accurate wavelength measurement of pulsed and CW lasers

The 871 Laser Wavelength Meter uses a proven Fizeau etalon design to measure the absolute wavelength of pulsed and CW lasers to an accuracy of ± 1 part per million (± 300 MHz at 1000 nm). This performance is maintained over long periods of time because the system is automatically calibrated with a built-in wavelength standard. In addition, the laser under test enters the model 871 through a pre-aligned fiber-optic input connector. This input method eliminates the need to visually inspect and optimize the interference patterns generated by the system's etalons and therefore results in uncompromised accuracy.

Fastest sustained wavelength measurement available

The 871 Laser Wavelength Meter uses a unique Fizeau etalon design to generate a spatial interferogram that is detected by a fast photodetector array. An on-board digital signal processor quickly converts the interferometric information to wavelength. Because this calculation is done internally, a sustained measurement rate as high as 1 kHz is achieved. In addition, wavelength measurements can be reported at this rate by data streaming with an RS-422 serial interface, or an internal data buffer is available to save up to one million measurements.

Broad wavelength coverage and straightforward operation

The 871 Laser Wavelength Meter is available in two broad wavelength configurations to satisfy most experimental requirements. These ranges are the VIS (375 - 1100 nm) and NIR (650 - 1700 nm). The system operates with a PC, running under Windows, via USB or Ethernet interface. Software is provided to control the 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. In addition, a browser-based application can be used with a tablet or smart phone to display laser wavelength information anywhere in the laboratory.

FEATURES

- Operates with both pulsed and CW lasers
- Wavelength measured to an accuracy of ±1 ppm
- Automatic calibration with a built-in wavelength standard
- Operation available from 375 to 1700 nm
- Measurement rate as high as 1 kHz
- Asynchronous operation with automatic pulse detection
- Pre-aligned fiber-optic input
- Straightforward operation with PC using USB or Ethernet interfaces
- Convenient tablet or smart phone display
- Integrates into experiment for automatic wavelength reporting and control

The Power of Precision in Wavelength Measurement

SPECIFICATIONS 871 Series

MODEL	871B-VIS	871B-NIR
LASER TYPE	Pulsed and CW	
WAVELENGTH		
Range	375 - 1100 nm	650 - 1700 nm
Absolute Accuracy [1, 2]	± 1 ppm ± 0.001 nm @ 1000 nm ± 0.01 cm^{-1} @ 10,000 cm^{-1} ± 300 MHz @ 300,000 GHz	
Repeatability [3, 4]	± 0.1 ppm ± 0.0001 nm @ 1000 nm ± 0.001 cm^{-1} @ 10,000 cm^{-1} ± 30 MHz @ 300,000 GHz	
Calibration [5]	Automatic with built-in wavelength standard	
Display Resolution	8 digits	
Units [6]	nm, µm, cm^{-1}, GHz, THz	
OPTICAL INPUT SIGNAL		
Maximum Bandwidth (FWHM)	10 GHz	
Minimum Input [7, 8, 9, 10]	0.2 µJ (375 nm) 0.02 µJ (700 nm) 0.5 µJ (1100 nm)	0.2 µJ (650 nm) 0.02 µJ (1100 nm) 0.02 µJ (1600 nm)
MEASUREMENT RATE [11]	500 Hz	1 kHz
INPUTS/OUTPUTS		
Optical Input [12]	Pre-aligned FC/UPC connector (graded-index fiber with ≤ 62.5 µm core diameter) optional free beam-to-fiber coupler	
Instrument Interface	USB 2.0 or Ethernet interface with Windows-based display program Browser-based display application Streaming via RS-422 (internal or external triggering) Internal data storage for up to 1 million measurements SCPI for custom and LabVIEW programming	
COMPUTER REQUIREMENTS	PC running Windows 7, 8 or 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
ENVIRONMENTAL [7]		
Warm-Up Time	15 minutes	
Temperature	+15°C to +30°C (-10°C to +70°C storage)	
Pressure	500 - 900 mm Hg	
Humidity	≤ 90% R.H. at + 40°C (no condensation)	
DIMENSIONS AND WEIGHT		
Dimensions (H x W x L)	3.5" x 17.0" x 15.0" (89 mm x 432 mm x 381 mm)	
Weight	17 lbs (7.65 kg)	
POWER REQUIREMENTS	90 - 264 VAC, 47 - 63 Hz, 50 VA max	

(1) Defined as measurement uncertainty, or maximum wavelength error, using a coverage factor of 3 providing a confidence level of ≥ 99.7%.
(2) Traceable to accepted physical standards.
(3) Standard deviation for a 10 minute measurement period after the instrument has reached thermal equilibrium.
(4) Wavelength resolution is approximately two times repeatability.
(5) For VIS version, stabilized single-frequency HeNe laser. For NIR version, laser diode locked to acetylene absorption (NIST Special Publication 260-133).
(6) Data in units of nm, µm, and cm^{-1} are given as vacuum values.
(7) Characteristic performance, but non-warranted.
(8) Required minimum energy from a single laser pulse. Greater sensitivity is achieved by increasing the length of the measurement window to allow for the integration of a greater number of laser pulses.
(9) Required minimum power is approximated by multiplying the required minimum energy by the selected measurement rate.
(10) Sensitivity at other wavelengths can be determined from graphs that are available upon request.
(11) For VIS version, the wavelength of every pulse is measured for a laser operating with a repetition rate of ≤ 500 Hz. For NIR version, the wavelength of every pulse is measured for a laser operating with a repetition rate of ≤ 1 kHz. At greater repetition rates, the system will integrate all pulses arriving within the measurement window.
(12) Optimization of the fringe pattern is not required.

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