C818-E027

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Excellence in Science

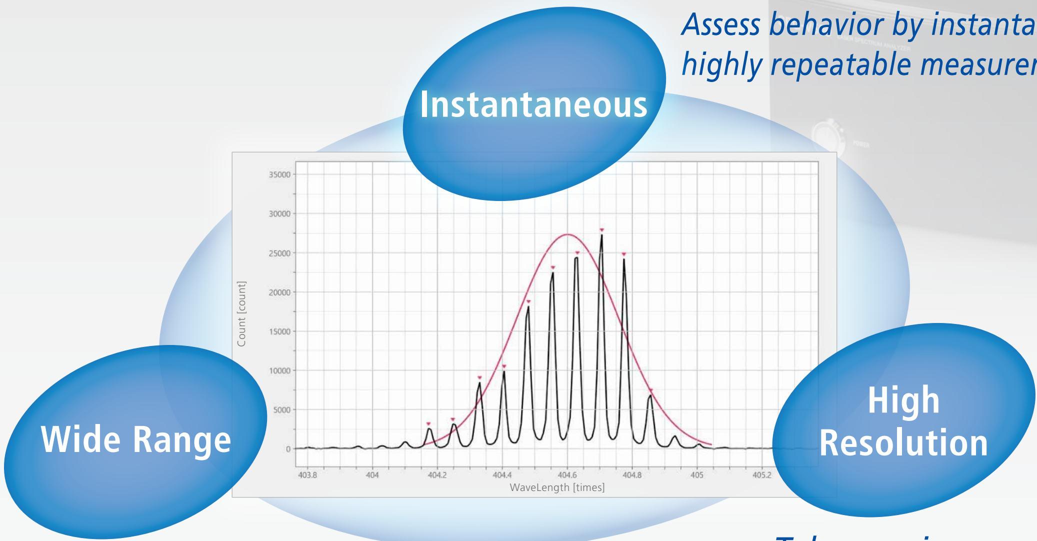
Laser Spectrum Analyzer

SPG-V500

Assess the Behavior of a Laser Spectrum in the Blink of an Eye Using High-Resolution Real-Time Measurements

An optical spectrum is obtained instantly using an array sensor, so the instrument provides high-resolution real-time measurements.
Mode hopping and other spectral behaviors that change moment by moment are assessed instantaneously, contributing to heightening the efficiency of the development and manufacturing of laser light sources.

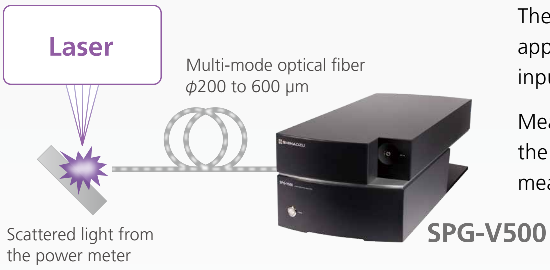
Assess behavior by instantaneous, highly repeatable measurements



A single unit accommodates lasers with wavelengths from 185 to 1095 nm

Take precise measurements with a high resolution of ≤0.04 nm

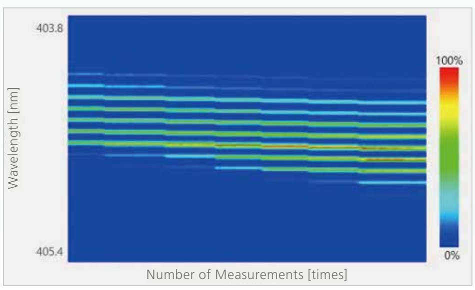
Light Input is Easy and Setup is Simple



The instrument is capable of a high-resolution measurement, approximately 0.02 nm (Typ.) even with multimode fiber input, so light input is easy, which can speed up the setup time.

Measurements can be performed just by orienting the optical fibers to the scattered light from the power meter, enabling simultaneous measurements of wavelength and output.

Measurement Functions for the Visualization of Spectral Behavior



The software includes functions (trend graphs and intensity maps) for visualizing changes in the laser time series.

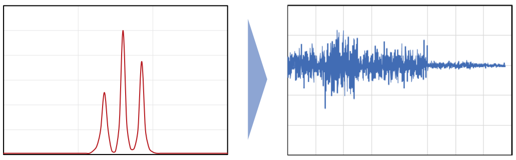
In an intensity map (figure at left), the vertical axis shows the wavelength, and the horizontal axis shows the number of measurements. With this approach, changes in the laser spectrum can be intuitively assessed, which is useful for the analysis of wavelength behavior and assembly adjustments.

Application

Spectral Behavioral Evaluations

The instrument can assess the instantaneous behavior of wavelengths, which can be used for configuring laser settings and evaluating wavelength stability. Thanks to the continuous storage function, time series changes in the wavelength can also be recorded.

Example: Wavelength behavior of a solid-state laser and simultaneous measurement of output noise



Checking Spectral Behavior　　Stabilization of Laser Output

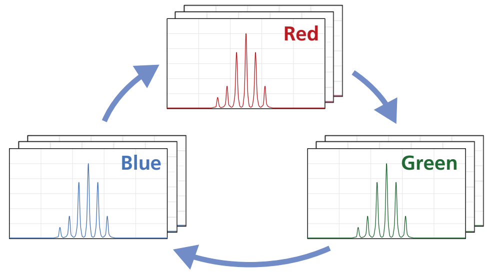
In order to reduce output noise, resonator adjustments can be performed while simultaneously measuring spectra and output using a power meter. This is useful for suppressing mode hopping (longitudinal mode instability).

▶Other Examples
- Adjustment of a single wavelength laser
- Noise suppression for a laser for optical analysis

Reliability Evaluations

Thanks to the interval storage function, spectral information can be periodically obtained and stored, and can be used for long-term reliability tests and thermal characteristics evaluations.

Example: Continuous lighting tests of RGB lasers



The spectrum of an RGB laser can be automatically stored continuously while switching wavelengths.

▶Other Example
- Surveying the effect of environmental temperature on lasers

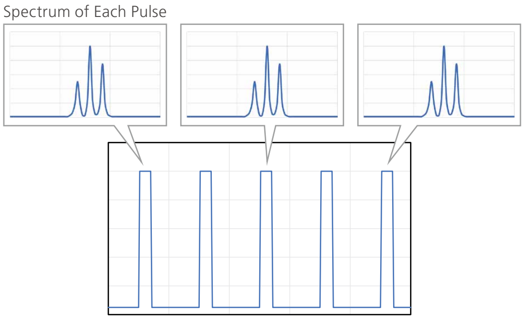
Spectral Measurements of Pulsed Lasers

The instrument can also accommodate measurements of pulsed lasers, in order to obtain the spectrum across a set range while simultaneously using an array sensor.
The spectrum of just a single pulse can be obtained by adjusting the measurement time (integration time).

Note: The possibility of measurement changes with the conditions, such as the number of laser repetitions and the output.

Example: Spectral evaluation of a Q switch laser

Spectrum of Each Pulse

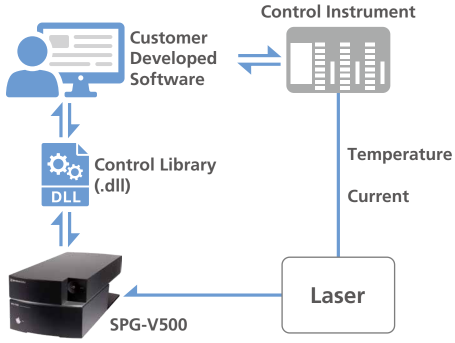


Pulsed Laser Output

Automation of Testing and Instrument Synchronization

Adjusting the optical axis is easy thanks to multimode fibers, and since measurement times are shortened, the instrument is also suitable for automating testing.
A control library compatible with C# and Python is provided, and synchronization with other devices is also possible.

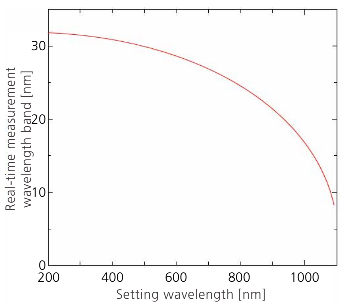
Example: Automatic evaluation of wavelength thermal and current characteristics



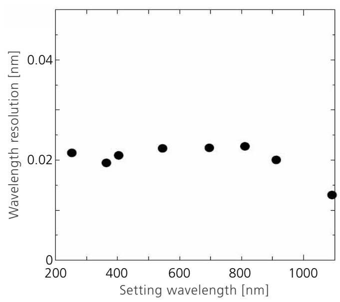
▶Other Example
- LD Chip Tester

Basic Data

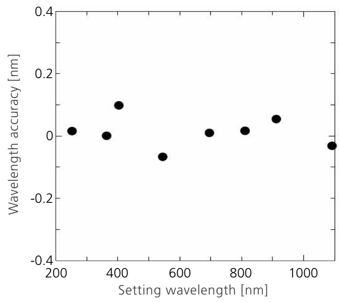
Real-time measurement wavelength band (designed value)



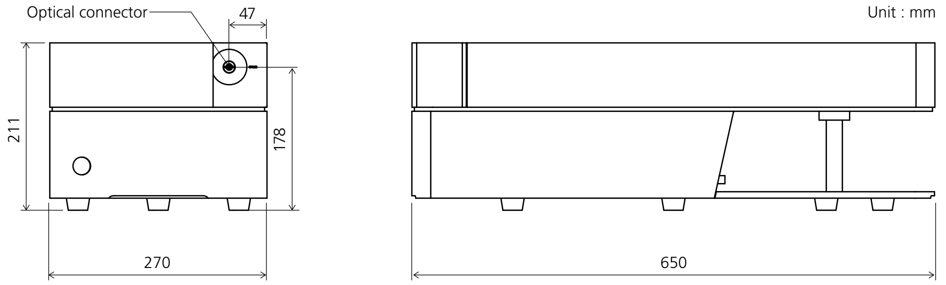
Wavelength resolution (Typ.)



Wavelength accuracy (Typ.)



Dimensions



Specifications

Item	Specifications	
Optical connector*1	FC connector	SMA connector
Measurement wavelength range*2, *3	185 to 1095 nm	
Real-time measurement wavelength band*4	31.8 to 8.2 nm	
Wavelength resolution*5	≤ 0.04 nm	
Wavelength accuracy*5, *6	±0.4 nm	
Dimensions and weight	W270 × D650 × H211 mm, 18.7 kg	
Accuracy guaranteed temperature	23±4 °C	
Operating temperature/humidity*7	23±10 °C, 30 to 70 %	
Control software	SPG-V500 Measurement Software	
Supported OS	Windows® 10 Pro (64bit) / Windows® 11 Pro	
Graph types*8	Spectral Graph, Trend Graph*9, Intensity Map	
Data analysis	Peak WL, FWHM, Threshold	
Save	Spectrum data saving*10, continuous saving*11, interval saving*12	
Inspection and adjustment function	Origin adjustment*13	
PC interface	USB 2.0	
Rated power supply	24 VDC, 1 A	
Input power supply (AC adapter)	100-200 VAC, 2-1 A, 50/60 Hz	
Accessories*14	AC adapter, USB cable, GND cable, power cable, control software CD*15, configuration file CD, Instruction Manual, sensor board driver CD	

*1 Install a optical fiber cable (sold separately) that meets each specification. Recommended core diameter is 200 to 600 μm. This product supports laser light input up to 10 mW.
*2 The set wavelength range is 190 to 1092 nm. The set wavelength is the wavelength measured near the center of the sensor.
*3 Use an order-sorting filter if the measurement light includes light with the n-th orders (such as 1/2, 1/3...) of the measurement wavelength.
*4 Wavelength interval that can be measured in real time. It is determined for each set wavelength.
*5 Inspection wavelengths are 253.7 nm, 546.1 nm, 912.3 nm, and 1092.1 nm. The value around the center of the sensor.
*6 The values are after using the origin adjustment function of the software.
*7 No condensation, dust, or vibration.
*8 The Viewer function allows you to check the spectral graph of the specified spectrum data.
*9 You can select Peak Counts, Total Counts, Number of Peaks, or FWHM/Center WL of Gaussian Fitting Curve.
*10 Function to manually save a piece of spectrum data (csv format, extension: dat). Spectral graph image data (PNG format) can also be saved.
*11 Function to automatically save up to 10000 consecutive data (csv format, extension: dat).
*12 Function to save up to 10 conditions and up to 1000 data per condition at specified intervals (10 to 1000 s) (csv format, extension: dat).
*13 The origin is automatically adjusted when white light source is incident and integration time is adjusted.
*14 PC and fiber optic cable are sold separately.
*15 DLLs (C#) and sample software (C# and Python) are provided enabling control of the instrument from the customer's software, for the purpose of constructing and incorporating inspection equipment.

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