

## LASER SPECTRUM ANALYZER

## 772B-MIR



### Spectral analysis of pulsed IR and Mid-IR lasers.

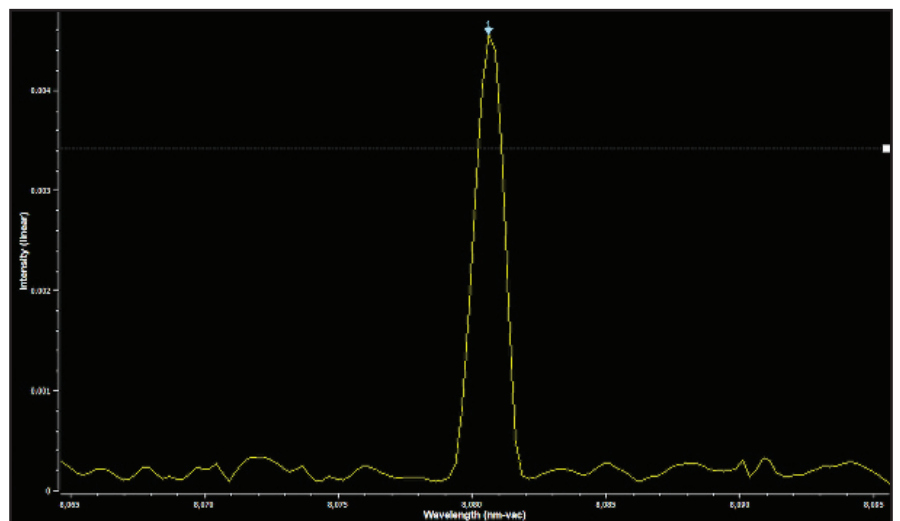
The 772B-MIR Laser Spectrum Analyzer combines proven Michelson interferometer technology with fast Fourier transform analysis to characterize the spectral properties of CW and pulsed lasers that operate from 1 to 12  $\mu\text{m}$ . When used with CW lasers, the model 772B-MIR operates and performs just like Bristol's 771B-MIR Laser Spectrum Analyzer. What makes the 772B-MIR system unique is that it employs a sophisticated algorithm to enable the measurement of pulsed lasers that have a repetition rate as low as 50 Hz.

When used with pulsed lasers, a single scan of the Michelson interferometer does not generate an interferogram that is sufficient to convert to a spectrum. Therefore, data from a number of laser pulses are collected from multiple scans of the interferometer to "build" a more complete interferogram.

The 772B-MIR Laser Spectrum Analyzer has a spectral resolution of 4 GHz and wavelength accuracy of  $\pm 10$  parts per million ( $\pm 0.08$  nm at 8  $\mu\text{m}$ ). An optical rejection ratio of about 15 - 20 dB is achieved assuming a sufficient number of laser pulses ( $\geq 30,000$ ) are used to generate the interferogram.

### Key Features:

- Spectral analysis of pulsed and CW lasers.
- Operation from 1 to 12  $\mu\text{m}$ .
- Spectral resolution of 4 GHz.
- Wavelength accuracy of  $\pm 10$  parts per million.
- Continuous calibration with a built-in wavelength standard.
- Optical rejection ratio as high as 20 dB.
- Free-space aperture input with visible alignment aid.
- Straightforward operation with a PC using USB or Ethernet.
- Display software provided to control measurement parameters, display spectra, and report wavelength data.
- Five-year warranty covers all parts and labor.



Spectrum of QCL operating at a pulse rate of 50 Hz and pulse length of 50 ns

# SPECIFICATIONS

# 772B-MIR

<b>LASER TYPE</b>	Pulsed (repetition rate > 50 Hz, duration > 20 ns)	CW (or quasi-CW with repetition rate > 50 kHz)
<b>WAVELENGTH</b>		
Range <sup>1</sup>	1 - 12 $\mu\text{m}$	
Accuracy <sup>2,3</sup>	$\pm 10$ parts per million $\pm 0.08$ nm @ 8 $\mu\text{m}$ $\pm 0.0125$ $\text{cm}^{-1}$ @ 1250 $\text{cm}^{-1}$ $\pm 375$ MHz @ 37.5 THz	$\pm 0.75$ parts per million (1-5 $\mu\text{m}$ ) $\pm 1$ parts per million (5-12 $\mu\text{m}$ )
Spectral Resolution <sup>4</sup>	4 GHz	
Calibration	Continuous - built-in standard HeNe laser	
Display Resolution	8 digits	
Units <sup>5</sup>	nm, $\mu\text{m}$ , $\text{cm}^{-1}$ , GHz, THz	
<b>OPTICAL REJECTION RATIO</b> <sup>6,7</sup>	10 - 20 dB (dependent on number of pulses acquired)	> 30 dB
<b>MINIMUM INPUT POWER</b> <sup>7</sup>	0.01 - 13 $\mu\text{W}$	
<b>MAXIMUM INPUT POWER</b>	100 nJ (10 ns duration)	10 mW
<b>MEASUREMENT TIME</b> <sup>7,8</sup>	Approximately 2x time required to collect chosen number of pulses, but not less than about 10 s	< 2 s
<b>INPUTS/OUTPUTS</b>		
Optical Input <sup>9</sup>	Collimated beam, 3 mm diameter aperture, visible tracer beam to facilitate alignment	
Instrument Interface	USB and Ethernet with Windows-based display program Library of commands (SCPI) for custom and LabVIEW programming using any PC operating system	
<b>COMPUTER REQUIREMENTS</b> <sup>10</sup>	PC running Windows 10/11, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
<b>ENVIRONMENTAL</b> <sup>7</sup>		
Warm-Up Time	None	
Temperature   Pressure   Humidity	+15°C to +30°C (-10°C to +70°C storage)   500 - 900 mm Hg   $\leq 90\%$ R.H. at + 40°C (no condensation)	
<b>DIMENSIONS AND WEIGHT</b>		
Dimensions (H x W x D) <sup>11</sup>	7.5" x 6.5" x 15.0" (191 mm x 165 mm x 381 mm)	
Weight	14 lbs (6.3 kg)	
<b>POWER REQUIREMENTS</b>	90 - 264 VAC, 47 - 63 Hz, 50 VA max	
<b>WARRANTY</b>	5 Years (parts and labor)	

- (1) Capable of operation to 14  $\mu\text{m}$ . Performance and specifications are not guaranteed beyond 12  $\mu\text{m}$ .
- (2) Defined as measurement uncertainty, or maximum wavelength error, with a confidence level of  $\geq 99.7\%$ .
- (3) Wavelength axis is calibrated to system's accuracy specification.
- (4) Defined as the measured full width at half maximum intensity (FWHM) of an infinitely narrow optical signal.
- (5) Data in units of nm,  $\mu\text{m}$ , and  $\text{cm}^{-1}$  are given as vacuum values.
- (6) Acquisition of 30,000 pulses will result in an optical rejection ratio of about 15-20 dB.
- (7) Characteristic performance, but non-warranted.
- (8) For example, approximately 60 s for 30,000 pulses from a 1 kHz pulse rate laser.
- (9) Required beam height is 5.4  $\pm$  0.25".
- (10) For use with Windows-based display program. Interface with SCPI can be done using any PC operating system.
- (11) Instrument height is adjustable (7.25  $\pm$  0.25") for alignment purposes.



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