

tunable mid-IR external-cavity

PULSED LASERS



Room Temperature[†] —

Operation:

Center Wavelengths: (units in μm)

No Chiller Required

Pulsed Only

3.3‡, 3.6‡, 3.8, 4.0, 4.2, 4.4, 4.5, 4.6, 4.9,
5.3, 6.1, 7.4, 7.8, 8.4‡, 9.0, 9.5, 10.4, 11.5

OPTICAL PARAMETERS

Tuning Range:

100 cm^{-1} Typical*
Guaranteed 75 cm^{-1}

Peak Power:

>250 mW Typical

Minimum Avg. Power:

1 mW

Maximum Avg. Power:

>5 mW Typical (@ 5% duty cycle)

Power Variations:

<5% pulse to pulse
<2% avg. over 1 hr.

Linewidth:

<1 cm^{-1} FWHM

Beam Divergence:

<5 mrad

Beam Waist:

30–50 cm Typical (from exit port*)

Polarization:

Vertically Polarized

Pointing Stability:

<1 mrad up to 100 cm^{-1} tuning

Spot Size Minimum:

<2.5 mm Diameter

Beam Quality:

TEM00

ELECTRICAL PARAMETERS

Pulse Width:

40 to 500 nsec (20 ns increments)

Pulse Repetition Frequency:

0.1 to 100 kHz (0.1 kHz increments)

Duty Cycle:

Up to 5%

Triggering:

Internal and External Pulse,
External Trigger

Scanning:

Uni- and Bi-directional survey scan,
Start, Stop, Step, Pause scanning
programmable

External Interface:

RS-232, GPIB supported,
USB supported in 2010

MECHANICAL PARAMETERS

Full Range Tuning Speed:

<1 sec for 100 cm^{-1} scan

Display Accuracy:

$\pm 1.0 \text{ cm}^{-1}$ uni-directional

Display Repeatability:

<0.02 cm^{-1} uni-directional

QCL Operational Temp:

15°C Typical

Relative Temp:

$\pm 5^\circ\text{C}$ Programmable

Package Size:

5.5" L \times 3.45" W \times 3.31" H

[†] Ambient Temp. 20°C, 10% to 90% Humidity

[‡] Wavelengths in development

*See diagram on back



Daylight Solutions is pleased to provide the world's first broadly tunable mid-IR lasers based on quantum cascade technology. Center wavelengths span the mid-IR spectrum from 4 μm to 12 μm and provide continuous tuning of up to 100 cm^{-1} ($\pm 5\%$ for a 10 μm center wavelength). All lasers offer superb wavelength accuracy and stability throughout their tuning range.

Designed by the world's leading experts in tunable lasers, these sources are small, robust, and utilize specially designed miniature lenses to optimize system performance. Each system integrates TEC technology for behind-the-scenes temperature control, so no cryogenic cooling is required.

To round out the turn-key system, each tunable laser is shipped with an intuitive, easy to use multifunction controller. The controller is accessible to a PC through RS-232, GPIB, and USB interfaces. This allows external control of the laser for a variety of applications, including scientific research and its development. The controller is also manually accessible through its easy to use front panel display.

Daylight Solutions' overall system leverages the last 15 years in tunable laser development and manufacturing, and incorporates the company's latest patent-pending tuning and packaging technology for the mid-IR.

The availability of robust, easy-to-use tunable lasers in the 4–12 μm region of the spectrum is now a reality. These lasers enable application research in the field of molecular detection and imaging. Common applications include industrial process control, the detection of biomarkers in the breath, cellular imaging, and the detection of chemical and biological agents.

Daylight Solutions' mid-IR laser platform technology opens up the mid-IR to all researchers—today. Please see our web site for information on other mid-IR laser systems, including tunable CW lasers.

Call today for pricing and availability of specific wavelengths.

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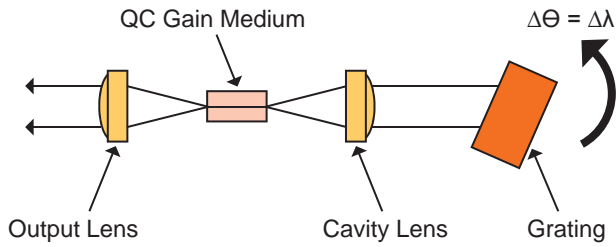
Email: info@daylightsolutions.com
www.daylightsolutions.com

DAYLIGHT
SOLUTIONS



Reference Performance and Function: Tunable Pulsed Laser

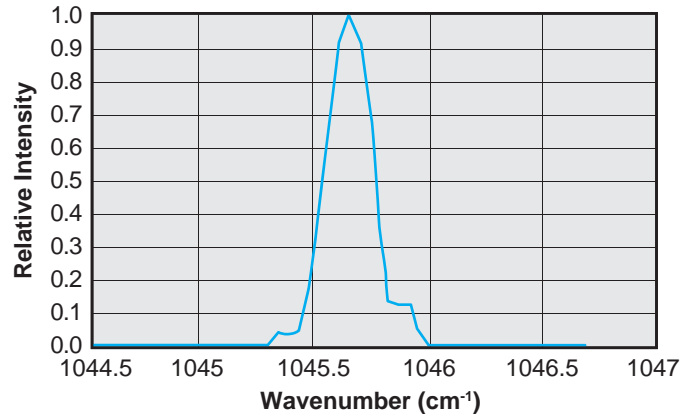
2006 PhAST/Laser Focus World
**Innovation Award
Winner**



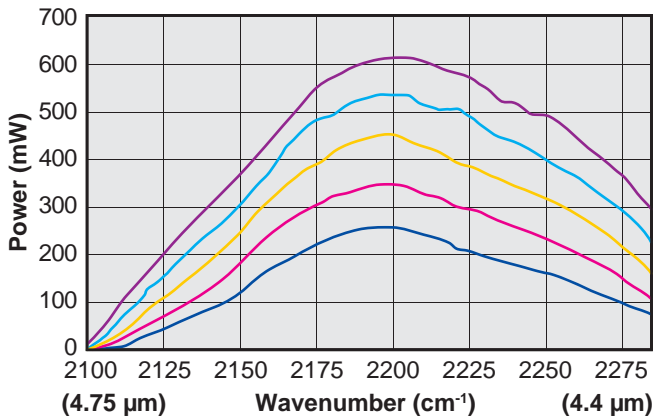
Cavity Design for ECqcL™

- Stepper motor rotates grating for survey scans
- Adjust to single wavelength or scan continuously
- Pulsed 5% duty (pulse width 500 nsec @ 100kHz)
- External Trigger or External Pulse via TTL Control
- TTL I/O for DAQ Control

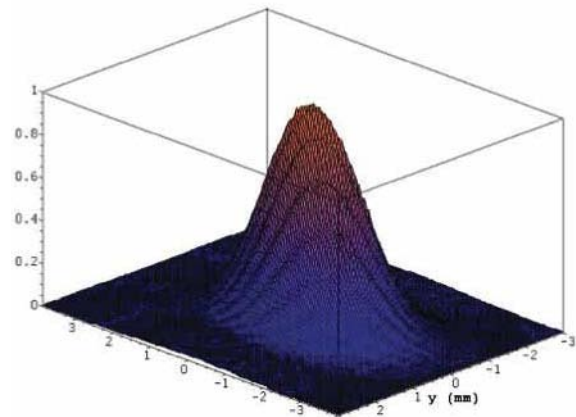
Pulsed Linewidth — Typical



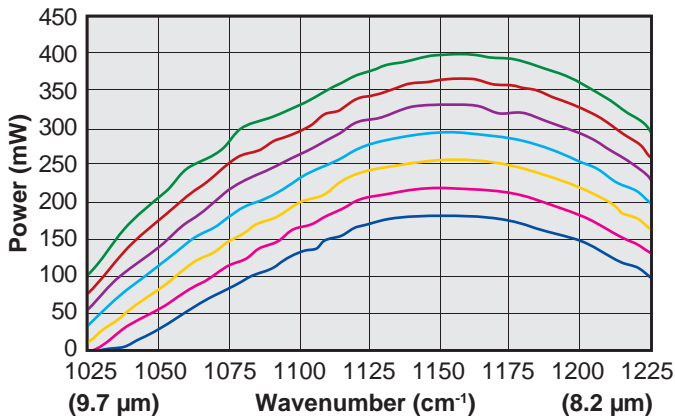
Peak Power vs. Wavelength 4.5 μm



Beam Profile — M² Typical 1.3



Peak Power vs. Wavelength 8.8 μm



Beam Propagation — Typical

