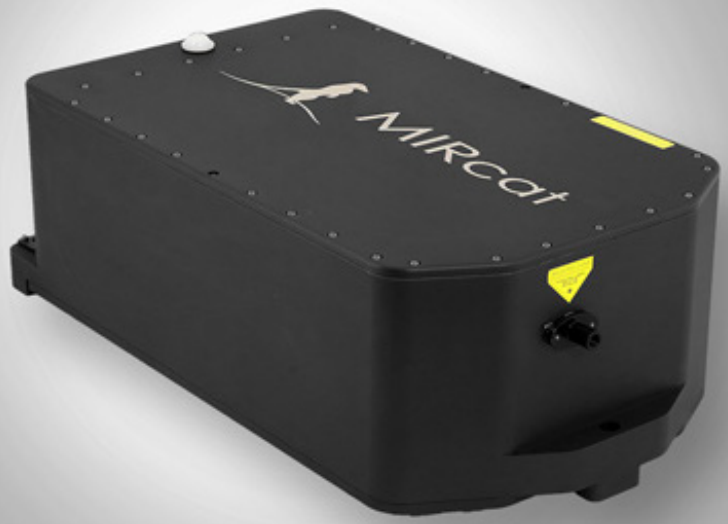
DRS DAYLIGHT SOLUTIONS



MIRcat™ QCL-IR SYSTEM

RAPID-SCAN, ULTRA-BROADLY TUNABLE MID-IR CW/PULSED LASER SYSTEM

Demanding Mid-IR spectroscopy applications such as nanoscale and microscale chemical imaging benefit greatly from rapid, high-SNR data acquisition. Until now, mid-IR laser sources required compromises in beam quality and wavelength fidelity to achieve high scan speeds. With the introduction of the new MIRcat, you can now have superior beam quality, wavelength fidelity, and fast continuous scanning (>1,000 cm^{-1} at 10 Hz) all in one ultra-broadly tunable, CW/pulsed mid-IR laser.

Incorporating the next generation of Daylight's field-proven Quantum Cascade Laser (QCL) technology, MIRcat delivers uncompromised performance in application-critical areas. This includes peak tuning speeds to >30,000 cm^{-1}/s, tuning ranges to >1,000 cm^{-1}, CW RIN as low as -140dBc/Hz, peak power output up to 1W[2], average power output up to 0.5W, and wavelength repeatability as high as <0.1cm^{-1} [1, 2]. In addition, MIRcat provides a single TEM_{00} output beam, which enables high-efficiency fiber coupling. In addition, the newest generation of MIRcat includes ZeroPoint™ technology, allowing for incredible beam pointing results of less than 100 µrad centroid change across the specified tuning range.

MIRcat's flexible, modular design allows users to factory-configure their system for up to four pulsed or CW/pulsed modules, upgrade it later[7], or add a visible aiming beam. With Daylight's proprietary HFQD™ (High-Fidelity QCL Drive) circuitry, your QCL chips are protected. With a GUI and SDK command set included as standard, MIRcat users can control wavelength set-points, scans, power, triggering, pulse width, duty cycle, and repetition rate in pulsed operation[8]. MIRcat brings new capabilities and agility to a wide range of molecular sensing applications including: process and quality control, remote sensing, imaging, and spectroscopy. Please contact us today to learn how MIRcat, and our highly experienced team, can help you.

FOR SPECTROSCOPY AT SPEED, WITHOUT COMPROMISE.

HIGHLIGHTS

- Tuning sweeps @ 10 Hz (>1,000 cm^{-1} in < 100 ms)
- Pulsed and CW operation modes
- Low relative intensity noise (RIN)
- Pulse repetition rates up to 3 MHz
- Pulse widths down to 40 ns
- Superb beam pointing (< 100 µrad beam centroid change across specified tuning range)

MIRcat SPECIFICATIONS

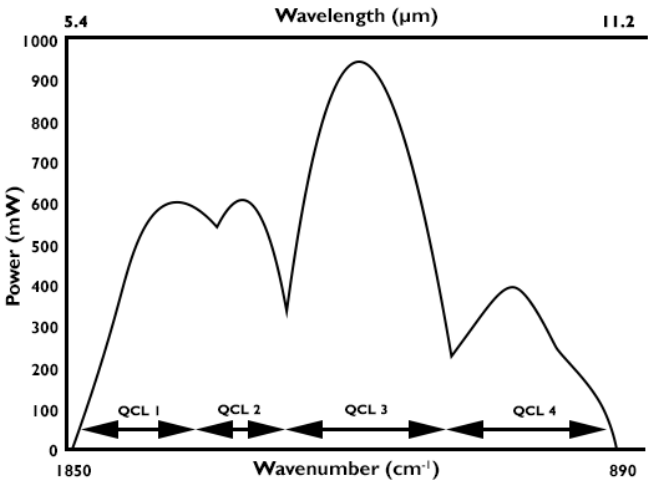
PERFORMANCE SPECIFICATIONS[1]	
Wavelength Availability	Center wavelengths from <4 µm to >13 µm
Modes of Operation	Pulsed or CW[2]
Available Configurations	Select 1, 2, 3, or 4 standard or custom laser modules
Tuning Modes	Set λ, Step & Measure, Continuous Scans
Max. Tuning Speed (Step)	250 ms step-and-settle time to arbitrary λ
Max. Tuning Speed (Scan)	Peak velocity to >30,000 cm^{-1}/s
Wavelength Accuracy	≤ 1 cm^{-1}
Average Power Stability	< 3% (1 hr)
Spatial Mode	TEM_{00} (nominal)
Beam Divergence	< 4 mrad at 4 µm (full angle, $1/e^2$ intensity width)[3,6]
Beam Pointing	< 100 µrad beam (depends on module)[4]
Spot Size	< 2.5 mm ($1/e^2$ intensity radius)[3,6]
Polarization	Linear, vertical, >100:1

PULSED OPERATION	
Peak Power	Up to 1W (depends on module)
Energy Stability	< 3%, standard deviation
Linewidth	≤ 1 cm^{-1} (FWHM)
Pulse Width[8]	40 to 1 µs, 20-ns increments
Repetition Rate[8]	0.1 kHz to 3 MHz, 0.1 kHz increments
Maximum Duty Cycle[8]	20% (custom up to 30%)

CW OPERATION	
Average Power	Up to 500 mW (depends on module)
Linewidth	≤ 100 MHz (FWHM, over 1s)[9]

OTHER PARAMETERS	
Triggering (Pulsed)	Internal/external, external pulse input
Triggering (Scans)	External wavelength step, scan start
External Control Interface[10]	USB 2.0
Temperature Range (°C)	15 to 30 °C (operating)
Humidity	0—80% RH, non-condensing
Cooling	Passive Air (pulsed, up to 5% duty cycle)[5] Water (CW, fast scans, or >5% duty cycle pulsed)
Power Requirements	≤ 2 A, 90 to 264VAC, 47 to 63Hz, single phase
Dimensions (L x W x H)	17.9 x 9.8 x 6.3 in. (45.5 x 24.9 x 16 cm)

HIGH-SPEED TUNING



Tune > 1,000 cm^{-1} in 100 ms
(Example Configuration: Pulsed, 5.4—13 µm) [3]

COMPLIES WITH 21 CFR 1040.10 AND 1040.11 EXCEPT FOR DEVIATIONS PURSUANT TO LASER NOTICE NO. 50, DATED JUNE 24, 2007. COMPLIES WITH IEC 60825-01

[1] All specifications are: subject to change without notice; defined at the tuning peak of each gain module; after a 10-min warm-up; at the factory-recommended operating current.

[2] CW - requires CW-capable chip.

[3] Typical value.

[4] Beam centroid change across tuning range.

[5] Fastest inter-module switching speeds may require water cooling—please inquire.

[6] Specification scales with wavelength—please inquire.

[7] Requires return to factory.

[8] Some chips can support pulses up to 10 µs, PRF up to 3 MHz, and duty cycles up tp 30% — please inquire.

[9] If laser is tuned for single longitudinal mode operation.

[10] GUI compatible with Windows© 10. Please inquire for other OS.

INVISIBLE LASER RADIATION
AVOID EXPOSURE TO THE BEAM
CLASS 3B LASER PRODUCT

CE

REV 12-2023

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