OPTON LASER INTERNATIONAL

DRS DAYLIGHT SOLUTIONS

World-Class Research Powered by Daylight

Quantum Cascade Lasers & Turnkey Instruments Enabling the Most Challenging Mid-IR Applications

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THE QCL-IR ADVANTAGE

The Fingerprint Region

In the same way that forensics identifies a person by their unique fingerprint, mid-infrared absorption spectroscopy enables accurate and quantitative chemical identification. Daylight couples the strong advantages of the mid-IR region with our Quantum Cascade Laser (QCL-IR) sources to enable challenging sensing and imaging applications.

SELECTIVE

Molecular fingerprint enables chemical ID of single and multiple analytes as well as probing higher-order structures

QUANTITATIVE

Simple application of Beer-Lambert Law using transmission-based measurements

SENSITIVE

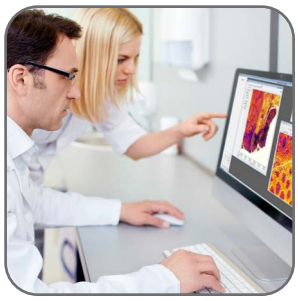
Enables multiple species to be detected simultaneously

NON DESTRUCTIVE

Direct measurements of molecules of interest without the need for labels, tags, or dyes

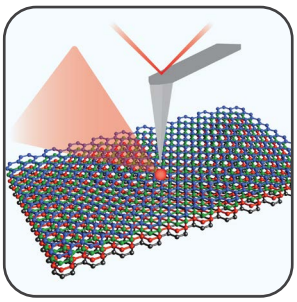
New Applications Powered by Daylight

As the leading provider of QCL sources, Daylight has empowered customers with a broad selection of QCL-IR solutions to meet research and OEM application needs. Daylight's best-in-class sources and systems empower the most demanding applications from wide-field infrared imaging for cancer research to high-power, infrared countermeasures for missile defense. Together, our technology, products, and collaborative approach offer customers next-generation solutions.



Microscopy

Microplastics



Nanoscale Imaging

Protein Analysis

Standoff Detection

Microfluidics

Material Processing

Environmental Monitoring

Over 200 Published Papers on QCL Technology and Applications

View Research Papers +

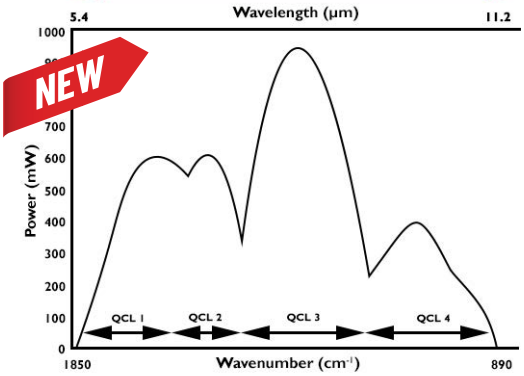
OUR CORE TECHNOLOGY

Quantum Cascade Lasers

The trusted performance of our mid-IR tunable lasers lets you go straight to your application for a fast track to publication. At the core of our products is our ECqcL™ technology. This laser source is rugged enough for high-power illumination in aircraft missile defense and reliable enough for scientific research where a broadly tunable, precision laser system is needed.

FASTEST TUNING SPEEDS

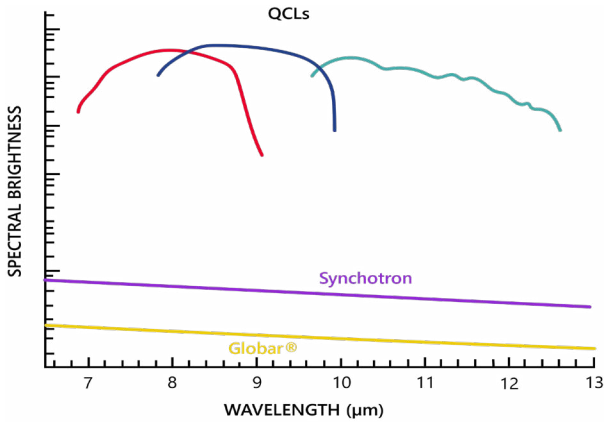
Daylight Solutions offers the fastest tuning speeds for QCLs on the market. Fast tuning not only offers higher throughput of data, but also enables applications where there is limited time to capture data. Rapid measurements give researchers an advantage in applications from cancer research for fast screening of tissue biomakers to spectroscopic measurements of hot gases.



Industry-leading mid-IR tuning speeds.
Peak velocities up to 30,000 cm^{-1}/s!

HIGH SPECTRAL BRIGHTNESS

The high spectral brightness of the QCL source is orders of magnitude higher than commonly-used mid-infrared sources such as the Globar® filiment used with FTIR systems or with light emitted from a synchotron facility. This enables higher Signal-To-Noise Ratio (SNR) for the most reliable data.



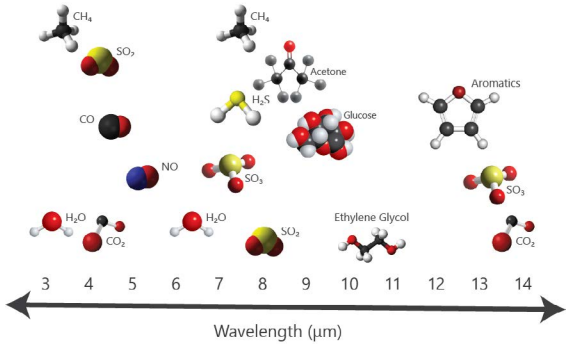
BEAM QUALITY

Superb beam pointing accuracy and stability combined with low beam divergence benefit applications such as nanoscale imaging, point-scanning microscopy, photothermal and photoacoustic imaging, stand-off detection, and single-mode fiber-optic coupling. Contact our sales team to learn more about Daylight's proprietary ZeroPoint™ capability.

MIRcat with ZeroPoint™ technology.
Pointing better than 1 **µ***Rad!*

BROAD WAVELENGTH COVERAGE

DRS Daylight Solutions offers the most extensive library of commercially-available QCL for both pulsed and continuous wave (CW) applications from 3.3 to >13 µm. Daylight Solutions' proprietary external cavity design allows users to tune widely across the spectrum when surveying for unknown molecules. Moreover, broad tuning enables higher dynamic range for greater sensitivity.



LASER SOURCES & ACCESSORIES

For Research & OEM Applications

TUNABLE LASER SYSTEMS

MIRcat™

Rapid-Scan, Multi-QCL

Hedgehog™

Rapid-Scan, Single QCL

CW-MHF™

Narrow Linewidth,
Tunes without Mode Hops

	MIRcat™ / Hedgehog™	CW-MHF™
MODE OF OPERATION		
	CW or Pulsed[1]	CW
TUNING SPEED		
	Up to 30,000 cm^{-1}/s (peak)	≤ 10 cm^{-1}/s
OUTPUT POWER		
	Up to 500 mW (peak or average)[1]	Up to 250 mW (average)[1]
LINEWIDTH (FWHM)		
	Pulsed: 1 cm^{-1} CW: < 100 MHz (<0.003 cm^{-1}, over 1 s)[2]	< 5 MHz (over 100 ms)
PULSE WIDTH RANGE		
	40 ns to 1 µs	—
BEAM QUALITY		
	TEM_{00}, near diffraction-limited	

[1] Depends on QCL selected [2] When laser is operating on a single longitudunal node

FIXED-WAVELENGTH LASERS

Aries™

High-Power, Fixed Wavelength

CW or Pulsed[1]
—
Up to 2 W (peak or average)[1][3]
< 1 cm^{-1} (Narrowband model) < 120 cm^{-1} (Broadband model)
500 ns to CW

[3] Subject to export restrictions

DETECTORS

Amplified MCT

Room-Temperature, Pulsed IR Detector

Pulsed
—
—
—

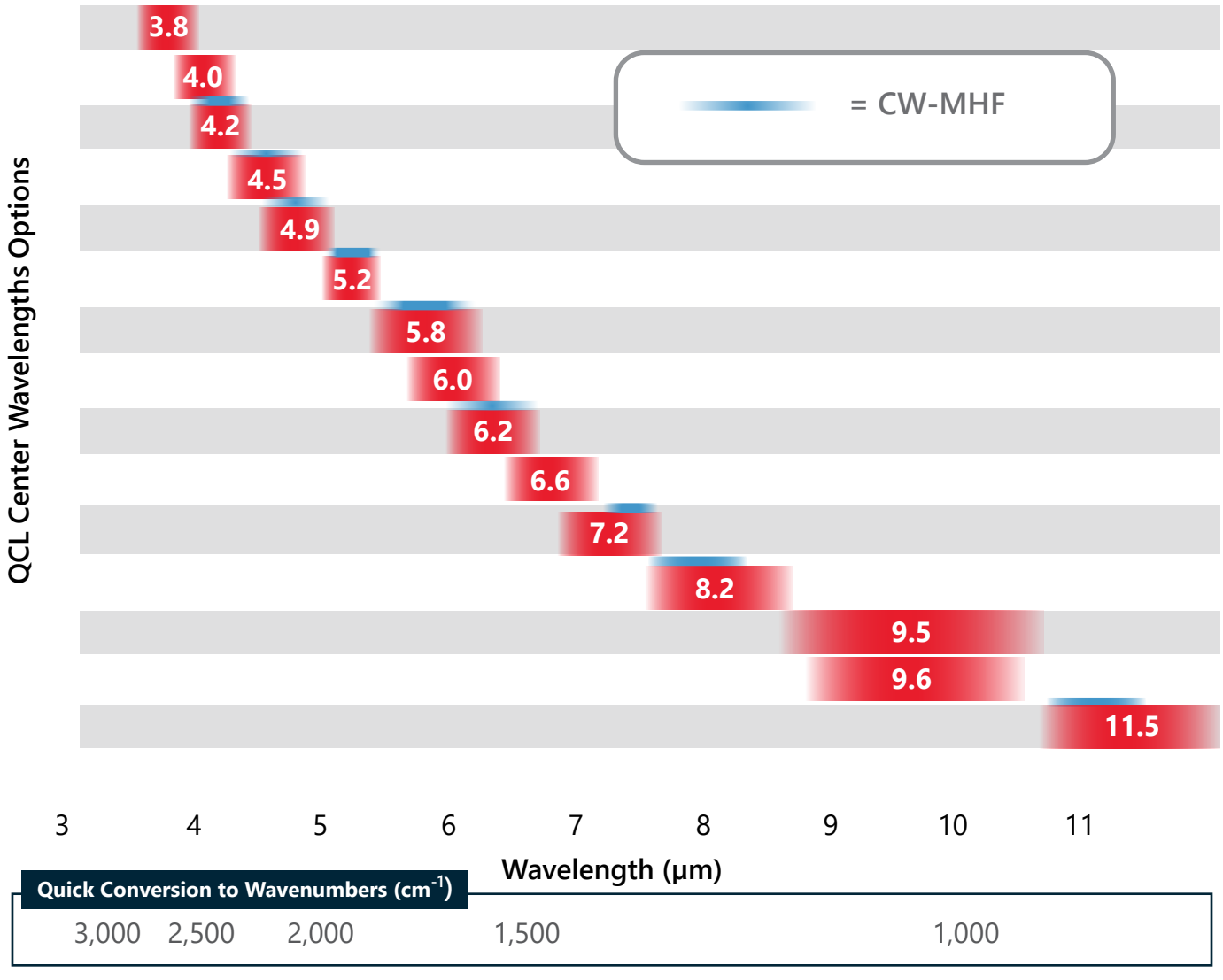
THE CHOICE IS YOURS

Laser Wavelength Options from 3.3 to 13.7 µm

DRS Daylight Solutions offers the most extensive library of commercially-available QCL for both pulsed and continuous wave (CW) applications. Up to four chips can be combined to cover your desired wavelengh range in our MIRcat-QT system or a single chip in our compact Hedgehog system.

Don't see what you are looking for? Daylight offers custom solutions to meet your application needs. Contact our sales team for more information.

CONTINUOUS WAVE (CW)

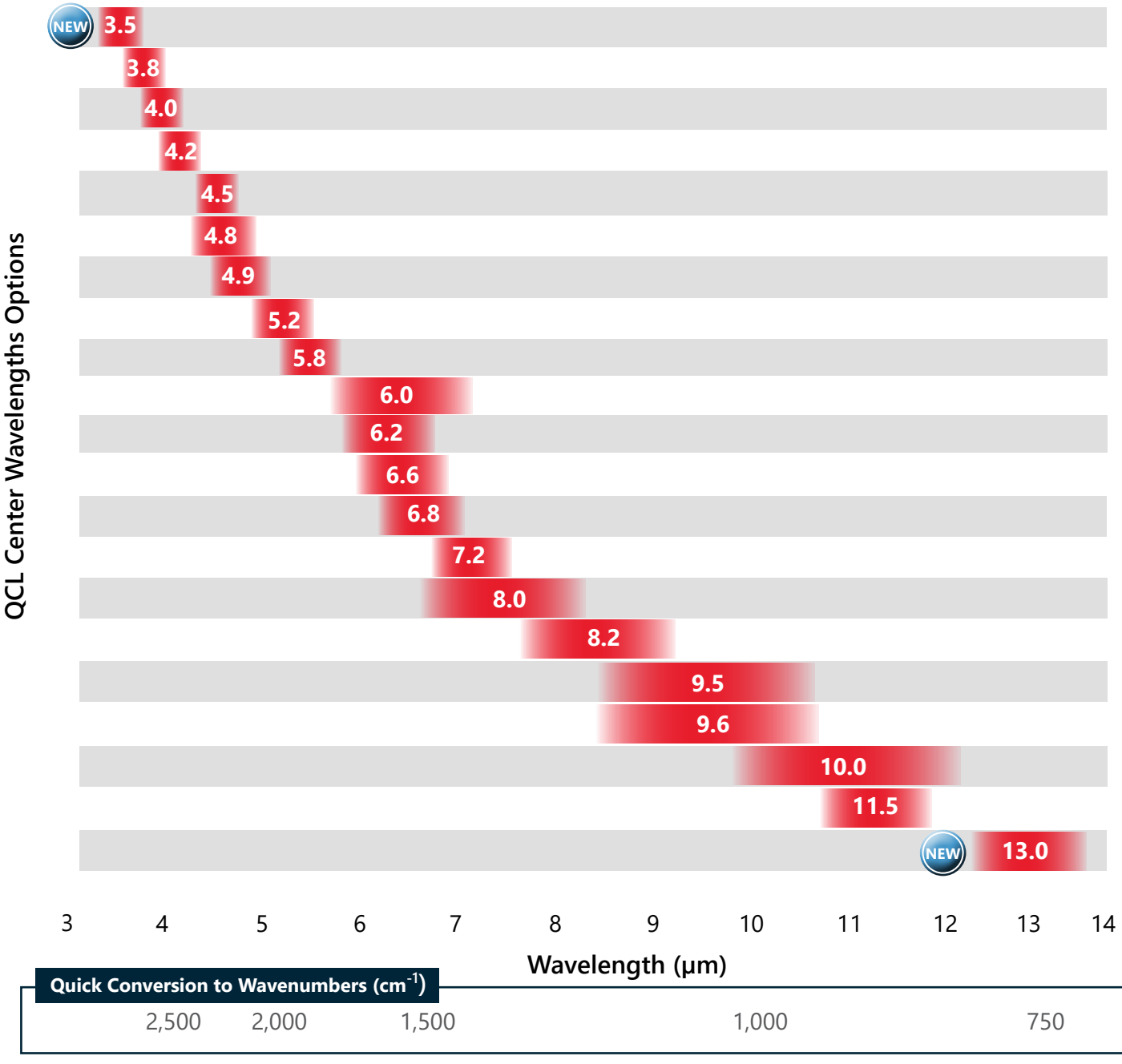


FIXED WAVELENGTH

Aries-2 Options (CW or Pulsed)

4.0
4.6
8.7
9.1
10.6

PULSED



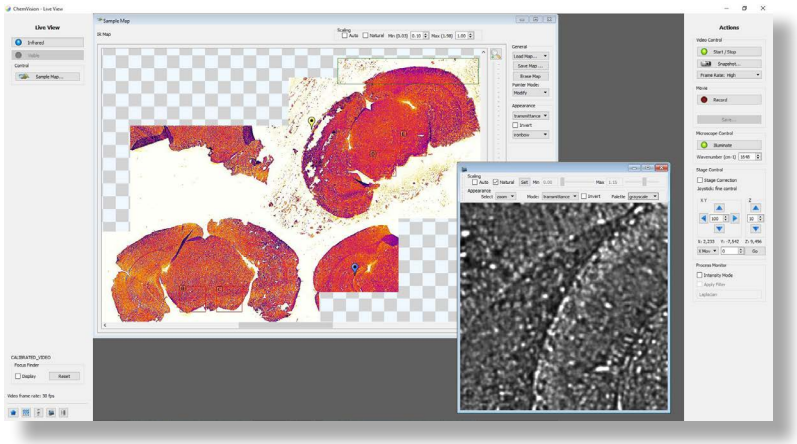
Quick Conversion to Wavenumbers (cm^{-1})

2,500 2,000 1,500 1,000 750

TURNKEY ANALYTICAL INSTRUMENTS

QCL Source Enabling High-Speed Data Acquisition

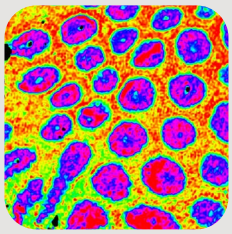
QCL-IR Microscope



Spero®

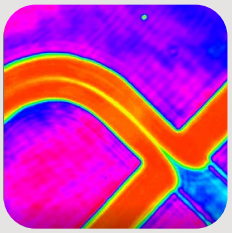
Proprietary Wide-field, QCL-IR Imaging at Video Rates

- » Real-time, high-throughput spectral imaging
- » No stains or molecular tags required
- » No cryogenic cooling needed
- » Transmission and transflection imaging modes

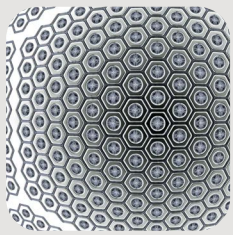


Tissue Imaging

Material Analysis

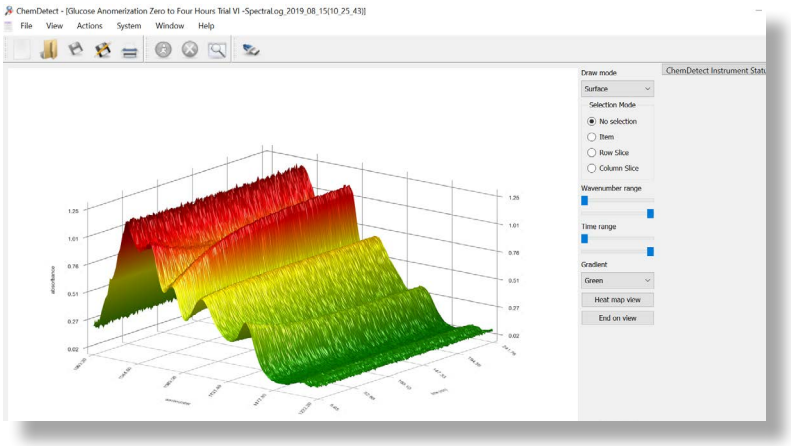


Microfluidics



Plasmonics & Metamaterials

QCL-IR Liquid Analyzers



Culpeo®

QCL-IR Liquid Analyzer

» Fine discrimination of target molecules
» High sensitivity with wide dynamic range
» Spectra or analyte concentration outputs
» Highly flexible platform to accommodate research applications

Protein Analysis

Water Quality

Liquid Chromatography

Reactor Monitoring

THE DAYLIGHT DIFFERENCE

The Most Trusted Provider in QCL Sources & Systems

PROVEN PERFORMANCE

We put our lasers to the test. With thousands of systems in the field and over 200 published research papers, Daylight works hard to provide reliable laser systems to our customers.

APPLICATION SUPPORT

We are here to help. Our team of application engineers have years of experience in the industry. Contact our expert customer support team for application support.

RESOURCES & TRAINING

Daylight offers unlimited access to research papers, application notes, videos, and webinars. Download from daylightsolutions.com/resources/.

OEM PARTNERSHIP

Daylight has expertise in working with OEM accounts to provide custom solutions that integrate into end-user systems. Contact our sales team to learn more about partnership opportunities.