
Methane Sensing
&
Thorlabs Laser Source Technologies

Thorlabs Quantum Electronics
Jessup, Maryland

John D. Bruno
Mid-IR Semiconductor Lasers

Natural Gas Infrastructure is Enormous

- *250,000 miles of transmission pipeline*
- *1700 Transmission Stations, 17,000 Compressors*
- *1,000,000 miles of distribution pipeline supported by 500-1000 gate stations supplying 132,000 surface metering and regulator sites*
- *61,000,000 customer meters*

Methane Leaks occur throughout the system

- *Lost revenue*
- *Unwanted greenhouse gas emission*

Technology Gap

Unavailability of low cost, sensitive, and fieldable sensors

Laser-based sensors cost too much!

Cost Drivers: laser sources, lenses, mirrors, etc.

The Good News: These costs are dropping!

Maxion Technologies, Inc. acquired by Thorlabs, Inc. on Nov. 1, 2012

IR Photonics Inc. acquired by Thorlabs, Inc. on Jan 3, 2013

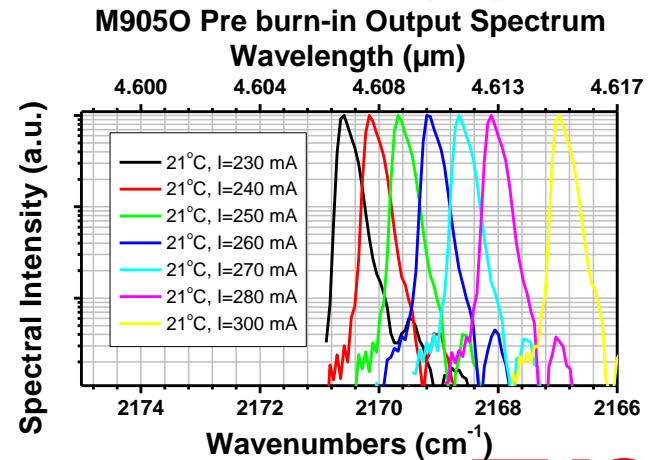
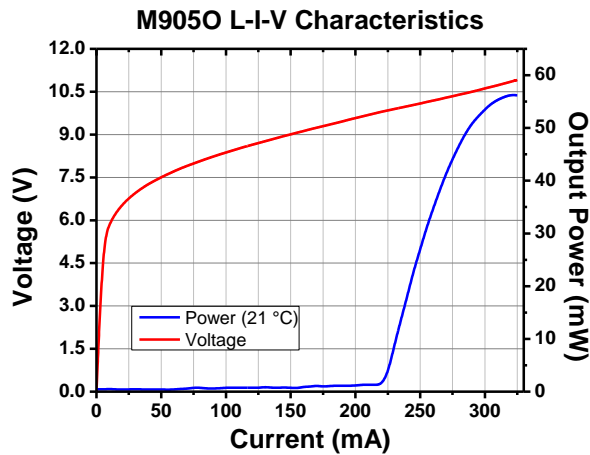
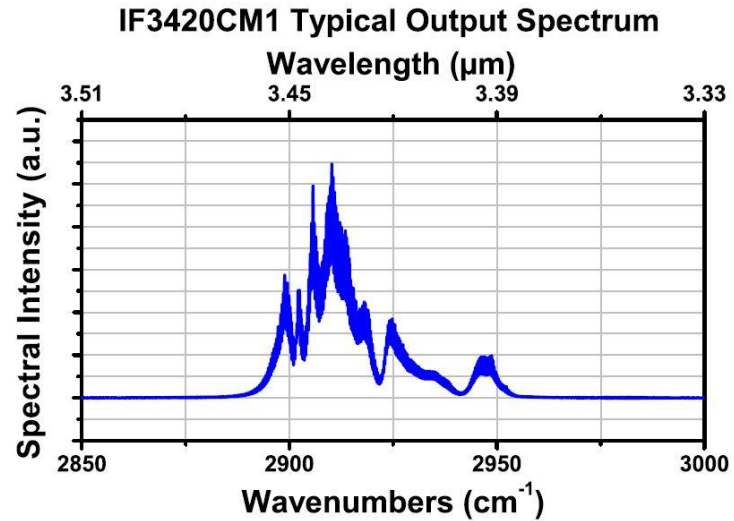
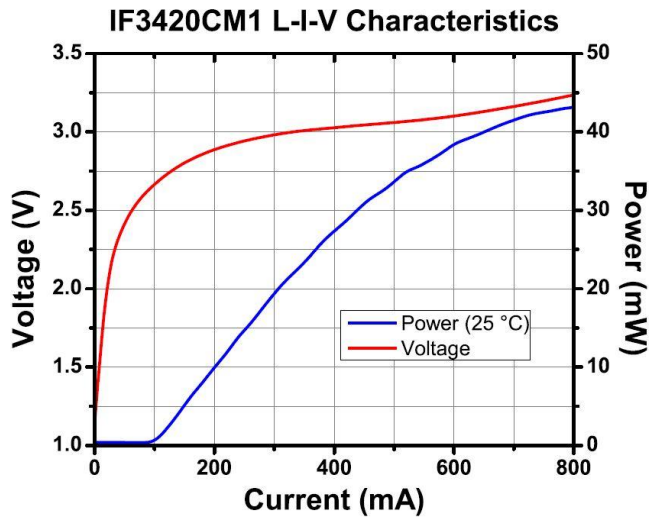


Location: Jessup, MD

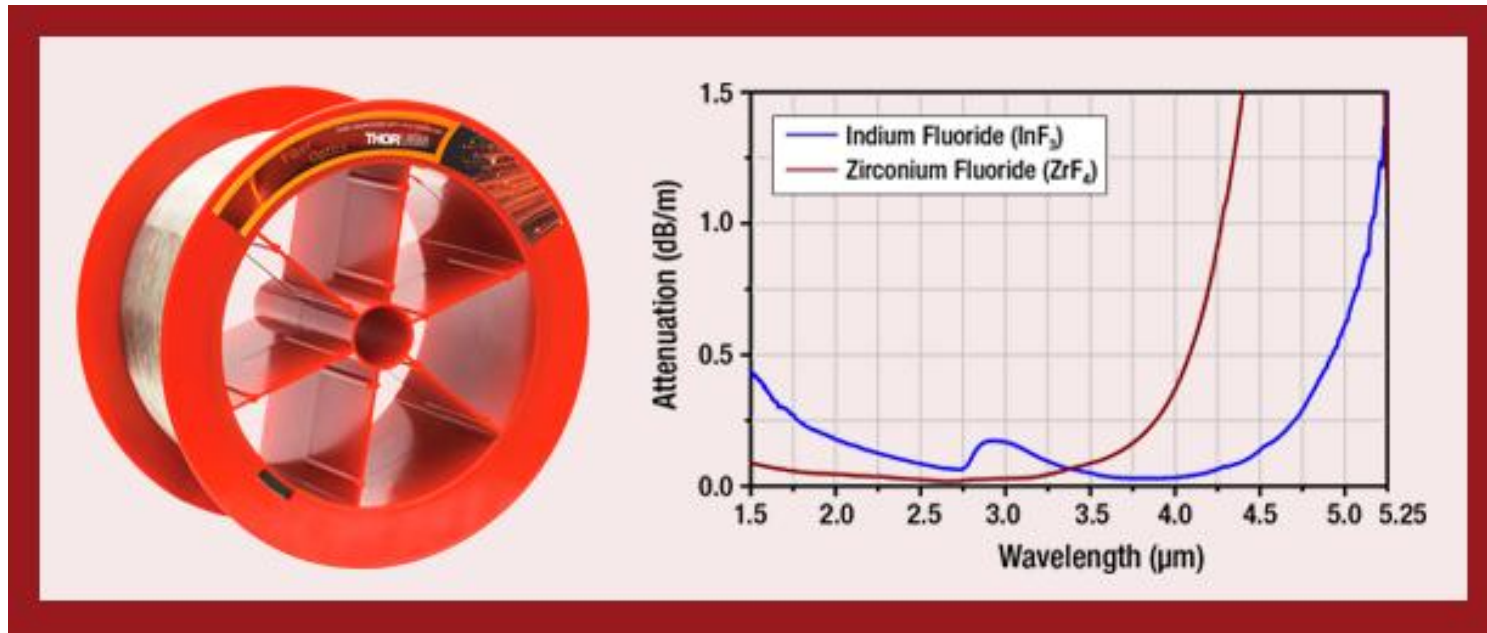
Number of Employees: ~ 70

Facility: 40,000 sf incl. 18,000 sf clean room

Thorlabs (Maxion) Manufactures Laser Gain Material for Methane Sensing



Thorlabs (IRPhotonics) Manufactures Low Loss Fluoride Glass Fibers for MIR



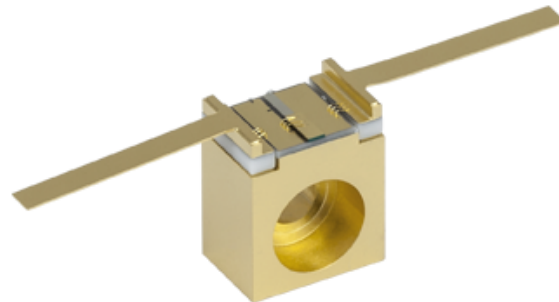
Thorlabs Objective: *Build out the infrastructure of MIR technology and grow the MIR market by reducing component costs*

[Products Home](#) >> [Coherent Sources](#) >> [Laser Diodes](#) >> MIR Lasers: Quantum Cascade Lasers and Interband Cascade Lasers

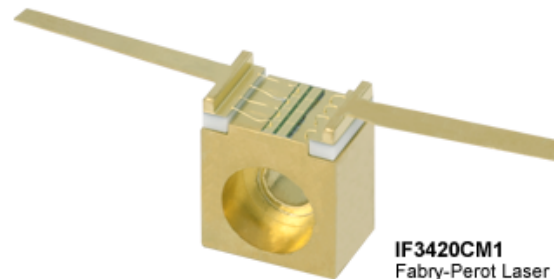
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MIR Lasers: Quantum Cascade Lasers and Interband Cascade Lasers

- ▶ Center Wavelengths: 3.42 – 9.55 μm (2924 – 1047 cm^{-1})
- ▶ Output Powers up to 450 mW
- ▶ Fabry-Perot Lasers and Distributed Feedback Lasers
- ▶ Shipped from Stock

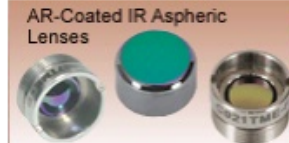


QD4580CM1
Distributed Feedback Laser



IF3420CM1
Fabry-Perot Laser

Related Items



[Overview](#) | [Drivers](#) | [Documents](#) | [Feedback](#) | [Tag Cloud](#)

Features

- Quantum Cascade Lasers (QCLs) and Interband Cascade Lasers (ICLs)
- CW Output:
 - 30 mW for ICLs
 - Up to 450 mW for QCLs
- Center Wavelengths from 3.42 μm to 9.55 μm (2924 cm^{-1} to 1047 cm^{-1})
- Broadband Fabry-Perot (FP) and Single-Wavelength Distributed Feedback (DFB) Options
- Compact Two-Tab C-Mount Package: 6.44 mm x 4.3 mm x 7.9 mm (L x W x H)
- QCLs are Electrically Isolated from C-Mount
- Custom Mounts or AR-Coated Front Facets Also Available (Contact [Tech Support](#) for Details)


With the acquisition of Maxion Technologies, Thorlabs is pleased to add a line of Quantum Cascade Lasers (QCLs) and Interband Cascade Lasers (ICLs) to its product portfolio. These devices, composed of multiple quantum well heterostructures, utilize intersubband (QCLs) or interband (ICLs)

Laser Diode Selection Guide

Shop by Wavelength	UV (375 nm) Visible (405 nm - 785 nm) NIR (808 nm - 2000 nm) MIR (3.42 μm - 9.55 μm)
	TO Can (Ø5.6, Ø9, and Ø9.5 mm) TO Can Pigtail (SM) TO Can Pigtail (PM) TO Can Pigtail (MM) Butterfly Package Chip on Submount One-Tab C-Mount Two-Tab C-Mount
Shop by Package	


If emission at a single wavelength is preferred, please consider the 4.54 - 4.62 μm Distributed Feedback Lasers sold below.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal/Imperial	Price	Available / Ships
Choose Item			QF4550CM1 NEW! 4.55 μm , 450 mW, Two-Tab C-Mount, Fabry-Perot Quantum Cascade Laser	\$4,800.00	✓ Today

Add To Cart


4.54 - 4.62 μm Distributed Feedback QCLs

Item #	Info	Wavelength	Power	Package	Pin Code	Wavelength Tested	Spatial Mode
QD4580CM1		Varies by Unit; Read Below	40 mW (Typical; Read Below)	Two-Tab C-Mount	N/A	Yes	Single

Distributed Feedback Lasers emit at a well defined center wavelength. To get the spectrum and output power of a specific, serial-numbered device, click "Choose Item" below, then click on the Docs Icon next to the serial number of the device. If a unit with the wavelength you need is not listed, please request it by contacting [Tech Support](#).


If broadband emission is preferred, please consider the 4.55 μm Fabry-Perot Lasers sold above.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal/Imperial	Price	Available / Ships
Choose Item			QD4580CM1 NEW! 4.54 - 4.62 μm , 40 mW, Two-Tab C-Mount, Distributed Feedback QCL	\$6,200.00	✓ Today


Add To Cart

9.55 μm Fabry-Perot QCL

Item #	Info	Wavelength	Power	Package	Pin Code	Wavelength Tested	Spatial Mode
QF9550CM1		9.55 μm (1047 cm^{-1})	80 mW	Two-Tab C-Mount	N/A	Yes	Single

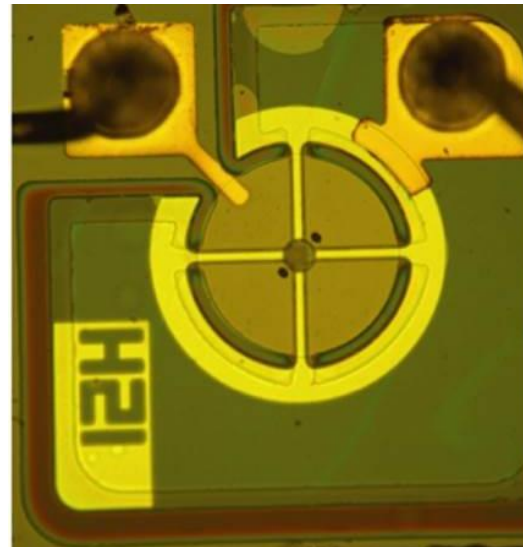
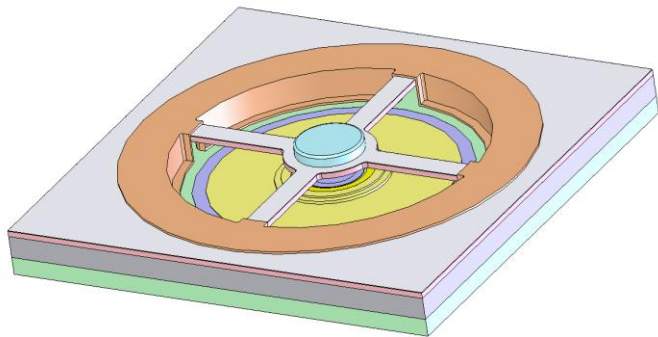
Fabry-Perot Lasers exhibit broadband emission. The center wavelength is defined as a weighted average over all the modes. The Info Icon in the table above gives a representative output spectrum for the QF9550CM1. To get the spectrum of a specific, serial-numbered device, click "Choose Item" below, then click on the Docs Icon next to the serial number of the device.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal/Imperial	Price	Available / Ships
Choose Item			QF9550CM1 NEW! 9.55 μm , 80 mW, Two-Tab C-Mount, Fabry-Perot Quantum Cascade Laser	\$4,800.00	✓ Today

Add To Cart

Component Technology Objective: Develop a tunable VCSEL using IC Gain material with a MEMs mirror



Low Cost Fiber Coupled VCSEL with 50 nm tunability around 3.33 microns