

QC-XT Laser Sources

QC-XT extended tuning quantum cascade lasers allow a very large tuning range of up to 2% of the central wavelength (40 cm^{-1} at 5 microns).

The system is controlled by three independent current inputs. Two inputs control the front and back mirrors of the cavity (I_F and I_B). The laser itself is driven by the laser current I_L and behaves as a normal DFB laser with the available range modified by the values of I_F and I_B . Fig. 1 shows a typical mode of use where using different mirror configurations, a large range spanning from 1268 to 1293 cm^{-1} is attainable with a single laser.

By using different mirror configurations, the laser can be rapidly switched between different configurations, allowing rapid multi-point sampling and/or scanning.

Key Features

- Wavelength and power independent control
- Direct access to any wavelength
- Extended tuning range at constant heat-sink temperature
- Narrow linewidth
- DFB wavelength reproducibility

Key Applications

- Increased wavelength scanning span fully electrically
- Possibility of arbitrary scanning scheme

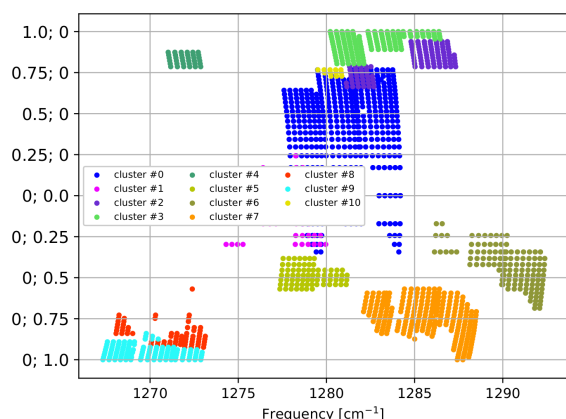
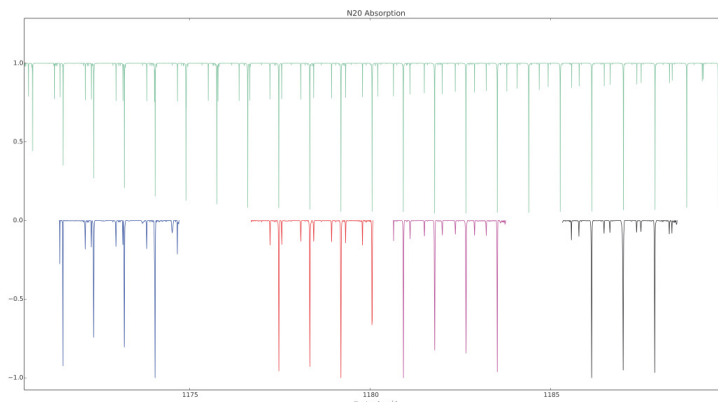


Fig. 1 This picture shows a typical QC-XT characterization table showing 10 different mirror configurations that can be used to span the 1268 - 1293 cm^{-1} range at fixed temperature.



Fig. 2 QC-XT lasers are typically delivered in HHL housings.

Fig. 3 Example of N_2O spectroscopy performed using four different configurations of a single QC-XT laser.



Specifications

QUANTITY	ACRONYM	MIN	TYP	MAX	UNIT	NOTE
Average Power			5		mW	1
Tuning Range			2.5	4	%	2
Duty Cycle				100	%	3
Wavelength Ranges		1060		1088	cm ⁻¹	4
		1248		1295	cm ⁻¹	
		1536		1604	cm ⁻¹	
		1735		1759	cm ⁻¹	
		2125		2154	cm ⁻¹	
		2154		2209	cm ⁻¹	
Laser Current			400	1500	mA	5
Laser Voltage			11	20	V	
Mirror Current			300	1500	mA	6
Mirror Voltage			4	12	V	
Operation Temperature			15		°C	7
Packaging			HHL			8
Dimensions			33×45×19		mm ³	9
TEC Current			1	2.5	A	10
TEC Voltage			3	11.6	V	
Heatsink Cooling Capacity		25	35	65	W	11

- The power emitted varies with laser current.
- The tuning range corresponds to the extreme excursion from the central wavelength accessible with a device. There can be gaps within the range.
- The devices typically operate CW but any type of laser current modulation is possible within the maximum ratings.
- The wavelengths ranges are available from stock. The QC-XT technology can be applied at any QCL attainable wavelength, please enquire for the lead-time of your wavelength of choice.
- With fixed mirror currents, the laser can be driven solely by the IL in the same manner as a DFB device.
- The mirror current sources can be fixed and do not require modulation or high compliance for the system to work. The system can function with only one source used at a time.
- The laser operation temperature may be limited if the heatsinking conditions provided to the package are not sufficient. Higher temperatures are possible but the tuning range may be reduced.
- Most lasers can be encapsulated in a HHL housing, but some lasers may require a larger XT-LLH housing to reach the required specifications.
- Overall dimensions, excluding 20 mm pins.
- The typical values are obtained in nominal conditions, deviations to these conditions towards cooler environment will reduce the cooling requirement and increase them for higher temperature conditions. A heat dissipation capacity of 10 W/K is recommended to ensure the heatsink temperature does not degrade significantly the cooling capacity.
- At ambient temperature.