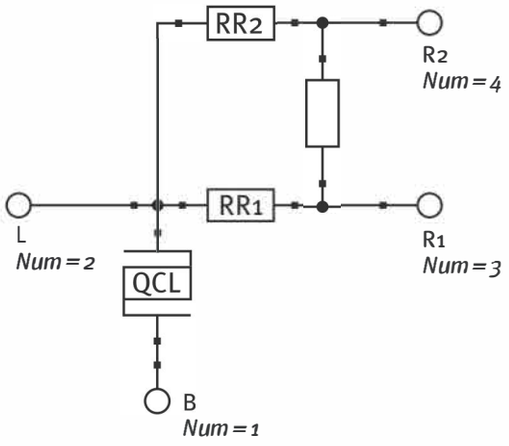
ALPES LASERS

The Source for Unipolar Quantum Cascade Lasers for Mid and Far Infrared

www.alpeslasers.ch

QC-XT Laser Sources



Alpes Lasers introduces a new class of QCLs, the QC-XT. QC-XT Lasers allow a very large tuning range of 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 a typical mode of use where using 5 different mirror configurations, a large continuous range 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.

Electro-optical Characteristics

QUANTITY	ACRONYM	MIN	TYP.	MAX	UNIT	NOTE
Average power	P	–	5	–	mW	1
Gapless tuning range	GTR	1.5	2	4	%	2
Allowed duty cycle	DC	–	–	100	%	3
Central wavelength	CWL					4
		1068	–	*1086*	cm^{-1}	
		1170	–	*1188*	cm^{-1}	
Laser current	I_L	–	400	1500	mA	5
Laser voltage	–	–	11	20	V	5
Mirror current	I_F and I_B		300	1500	mA	6
Mirror voltage	–	–	4	12	V	6
Operation temperature	T_{op}	–	30	–	°C	7
Packaging	–	–	HHL	–	–	8
Dimensions	LxWxH	33x45x19			mm^3	8
TEC current	TECI	1.5	2.0	3.0	A	9
TEC voltage	TECV	9.0	12.0	18.0	V	9
Heatsink cooling capacity	–	25	35	65	W	

Key features

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

Key benefits

- Increased wavelength scanning span fully electrically (Increased electrical wavelength scan)
- Possibility of arbitrary scanning scheme
- DFB wavelength reproducibility
- DFB linewidth and noise

CLASS 3B LASER PRODUCT

Data presented are valid across the spectral range where QC lasers can be manufactured and the typical values are given for a 1080 cm^{-1} laser. These specifications may be changed without further notice.

1. The power emitted varies with laser current. For any wavelength within the achievable range, there exists a combination of values I_F I_B and I_L which achieves the quoted power.
2. The tuning range can be extended if gaps can be allowed in the coverage.
3. The devices typically operate CW but any type of laser current modulation is possible within the maximum ratings.
4. The QC-XT technology can be applied at any QCL attainable wavelength, please enquire for the lead-time of your wavelength of choice. Presently devices around 1080 or 1180 cm^{-1} are available within a short time frame.
5. With fixed mirror currents, the laser can be driven solely by the I_L in the same manner as a DFB device.
6. 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.
7. 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.
8. Overall dimensions, excluding 20 mm pins. Other configurations may be adapted, please enquire.
9. 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.

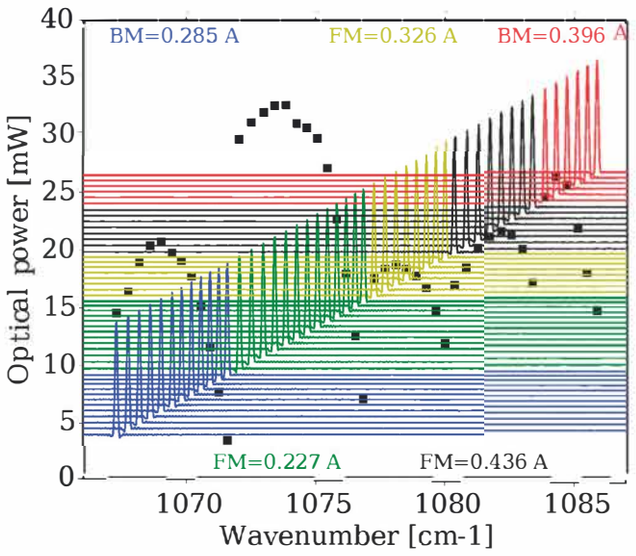


Fig. 1 Example of a tuning sequence which achieves a minimum power of 5 mW at every wavelength using 5 different mirror configuration. Within each fixed configuration, the power varies with I_L.

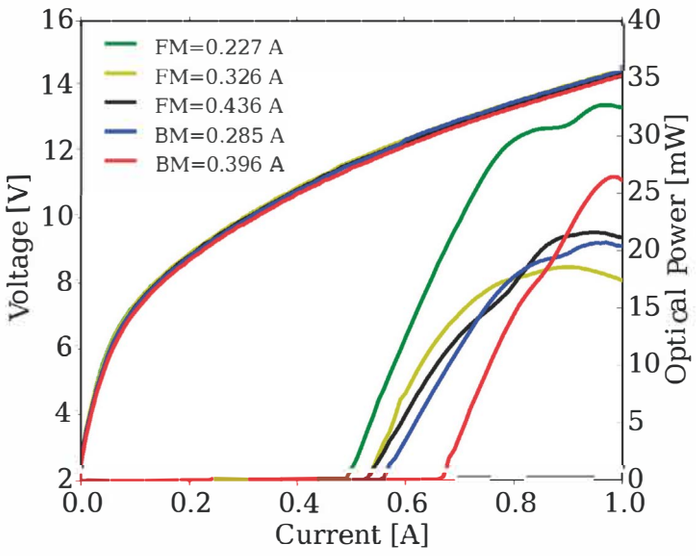


Fig. 2 Within each fixed configuration, the power varies with I_L and can be used in the same manner as a standard DFB laser.

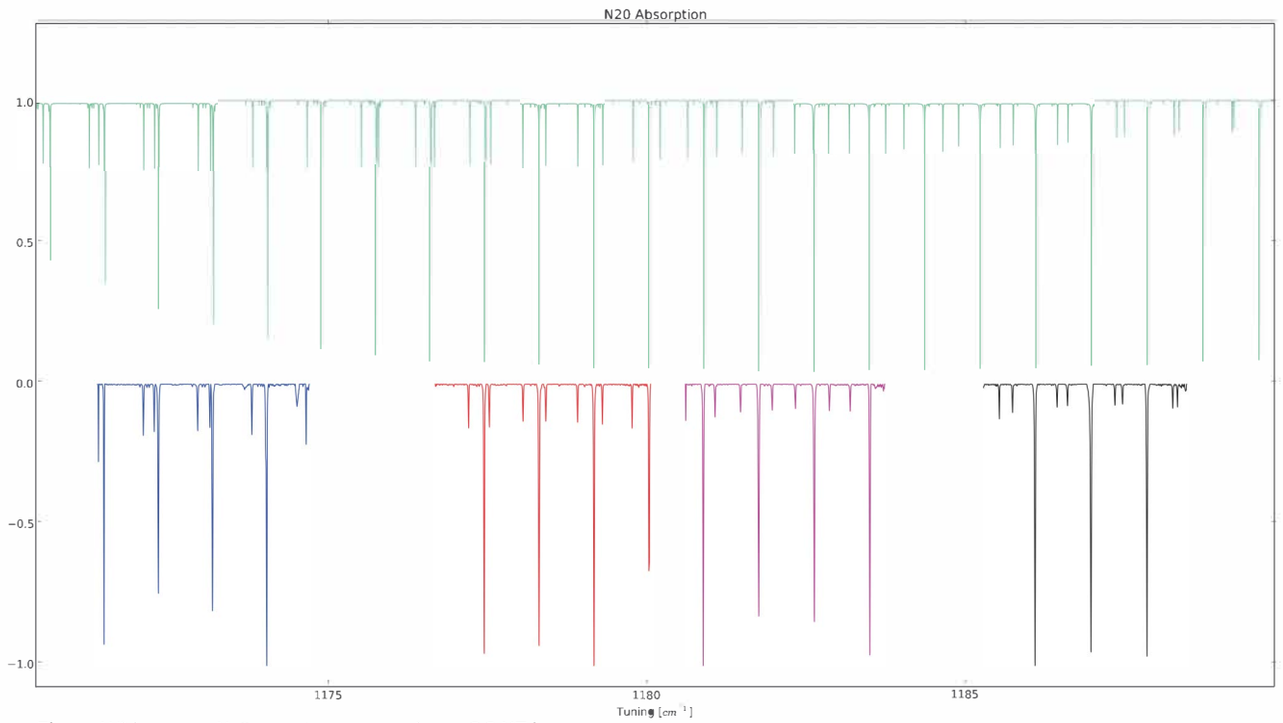


Fig. 3 Wide range N_2O spectroscopy using a QC-XT laser