EasyQCL-110 :
Terahertz Quantum Cascade Laser System

LONGWAVE PHOTONICS

The **EasyQCL-110** system is a turnkey source of terahertz radiation which uses an integral Stirling Cycle cooler for cryogen free, and alignment free operation. A range of user interchangeable multimode QCL modules are available providing **milliwatt** power levels at frequencies **between 1.8 to 5 THz**. The **EasyQCL-110** now has a **multi-QCL** option, which integrates up to four, automatically switched QCLs in the same system.

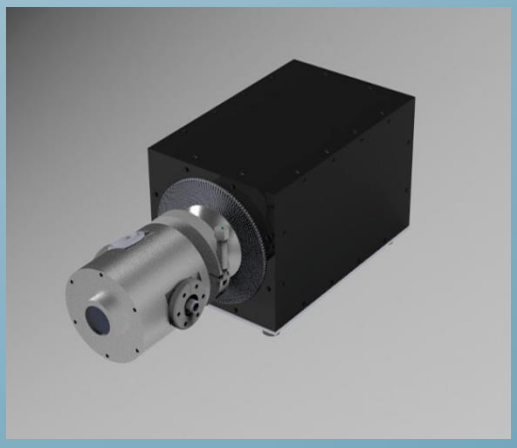
- The **EasyQCL-110** System Includes:
  - QCL laser diode module
  - Stirling Cycle Cooler
  - QCL drive electronics capable of pulsed or continuous wave operation (<0.4 µs up to DC)

- A variety of user interchangeable **QCL modules** are available:
  - Milliwatt average power levels
  - Continuous wave operation available at select frequencies
  - Choice of center frequencies ranging from 1.8 to 5 THz
  - Multimode operation
  - Single mode output at select frequencies

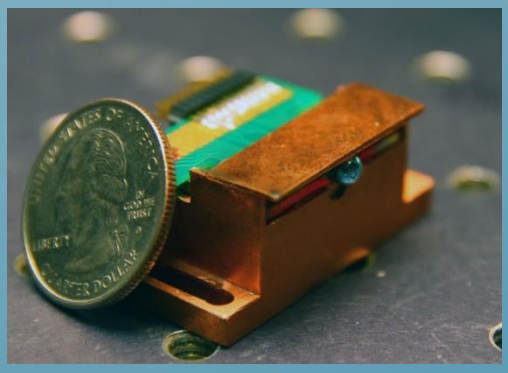
- The **EasyQCL-110** system is designed for ease of use:
  - Cryogen free– laser diode cooling is by closed cycle refrigeration
  - No optical alignment
  - Stirling cycle cooler is maintenance free
  - Laser bias is manually or computer controlled (USB and Windows XP/Vista/7 compatible)
  - Complete package is tabletop compact, portable and operates on 120/240 V (5A)

- The **EasyQCL-110** has **double** the cooling power of the EasyQCL-100 allowing the use of larger QCL devices: this effectively doubles the available output power.

- Applications:
  - Illumination source for focal plane arrays
  - Gas spectroscopy of MHz wide absorption features
  - Noise and responsivity Characterization of detectors



EasyQCL-110 System



THz QCL Module

Data Sheet

EasyQCL-110 Technical Data

Included Components:

- QCL device(s) characterized for wavelength, output power, beam divergence and current versus voltage
- Vacuum chamber with electrical feedthroughs and vacuum gauge
- Liquid /Air cooled, low-vibration Stirling cycle cryocooler
- LWP-PS2 laser driver
- Compact rotary vane vacuum pump
- Laptop PC with software for control of the driver and cryocooler

QCL Characteristics:

- Multimode and single mode laser diodes available.
- Beam divergence from 5 to 35 degrees FWHM
- Select devices operable in continuous wave

LWP-PS2 Laser Driver Specifications:

QCL Driver Electronics (FPO typical values):

Current:	Up to 2 A
Voltage:	Up to 100 V
Pulsed width:	0.2 µs up to DC
Frequency:	100 Hz to 100 KHz
Triggering:	TTL Internal/External Gate BNC connector
Interface:	USB
Compatibility:	Windows XP/Vista/7
Software Options:	Laser bias current/voltage, pulse width, duty cycle and trigger source (internal external)
AC voltage range:	100 - 125 / 200 - 240 V
Rated frequency:	50 - 60 Hz
Rated Current:	120 V/5 A – 240 V/ 2.5 A
Interface/Control:	USB

Stirling Cycle Cryocooler Specifications:

- Room Temperature, no cryogens.
- Cooldown time < 30 min to ~50 K
- Maintenance:Cold head requires periodic vacuum purge to ~10^{-2} mbar with provided compact vacuum pump (e.g. Edwards E2M0.7 or similar). No turbo pumping required.

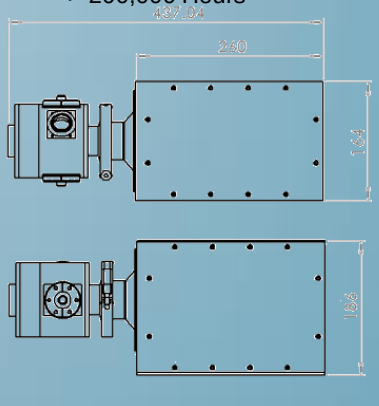
AC voltage range:	100 - 125 / 200 - 240 V
Rated frequency:	50 - 60 Hz
Rated Current:	120 V/5 A – 240 V/ 2.5 A
Interface/Control:	USB
Operating modes:	Closed/open loop temperature control

Warranty

- One year parts and labor

Temperature / dimensions / weight:

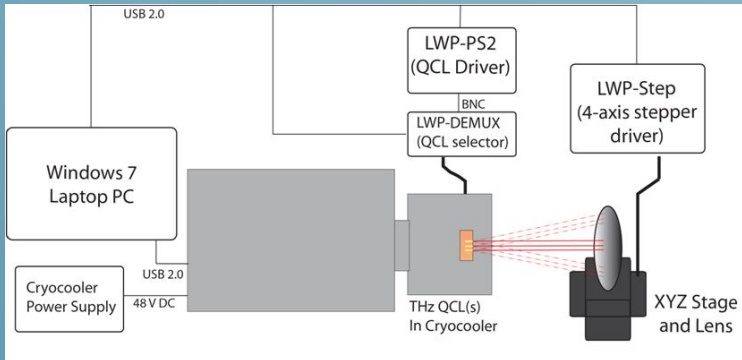
Weight:	~5 Kg
Stirling Cooler MTTF:	> 200,000 Hours
Approx. Dimensions:	



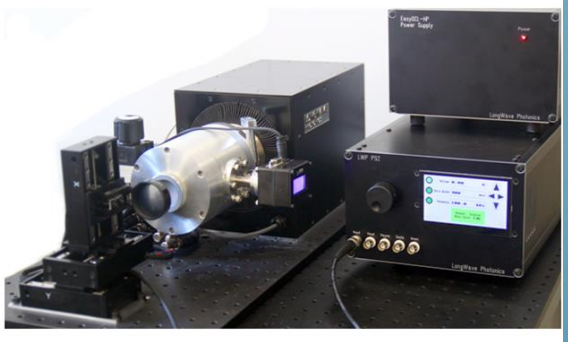
(Air cooled model pictured. Dimensions in mm)

multi-QCL Option:

- The **multi-QCL** option allows up to 4 QCLs to be mounted in the cryocooler
- Devices are switched automatically using the **LWP-DEMUX** demultiplexing switch
- Beams are collimated and positioned using an HR silicon lens on a motorized 3-axis stage, **LWP-STEP**



Typical Connection Diagram for **multi-QCL** option



EasyQCL-HP System with **multi-QCL** option with LWP-PS2 Driver

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