Laser System FAQ List

Frequently Asked Questions about the Laser System and its Subcomponents

1. Can we use third party equipment to control the laser?

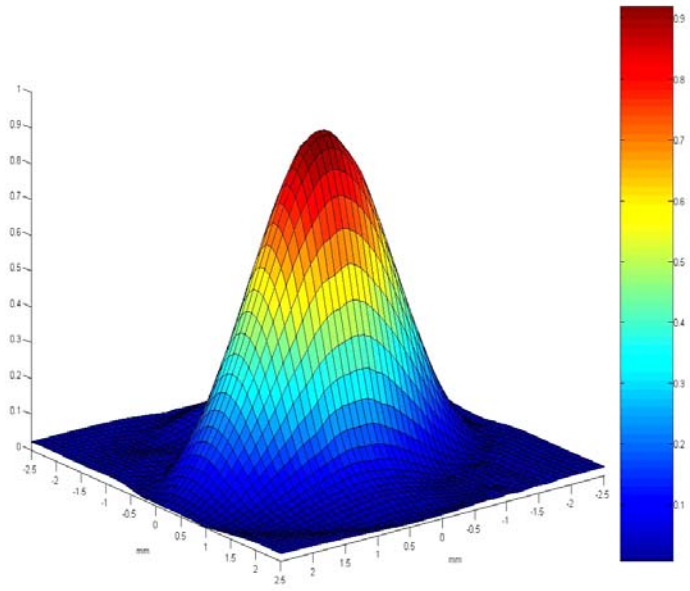
While we would recommend that the control and interface modules are purchased with the developer head it is possible to control the head using external inputs from laboratory equipment. You would need a thermoelectric temperature controller, TTL pulse generator and 0-5V analogue input for pulse amplitude.

2. How efficient is the heat removal from the laser submount?

The submount is mechanically clamped to a mounting plate, which is directly soldered onto the two stage peltier element. This peltier element is in turn soldered onto a back plate, which is in direct contact with either the fan or water cooled heatsink. The system has been designed to remove more than 2 watts of heat at a temperature of -30 deg C (fan heatsink). Lower temperatures can be obtained with the water cooled heatsink option. At room temperature the peltier can remove over 10 watts.

3. What's the specification of the ZnSe collimating optics?

The ZnSe lens is a three element design that has been optimized for minimum divergence and excellent beam quality. Underneath is a profile of a QCL beam taken at 2m with the collimating lens. Fit to a Gaussian profile is excellent. Transmission through the collimator is better than 96% between 5 and12 um. The lens has been designed to collect a 60 degree FWHM diverging beam.



Beam Divergence < 0.1 mrad

WFNO - 0.85

Working distance - 2.55 mm

Collection Efficiency > 95% for 60 degree FWHM diverging beam

AR Coating > 99% Transmission per surface between 5 and 12 um

4. Do you have other collimating options?

Lenses can be custom designed to fit your individual needs. Other materials can be used to reflect your specific environmental or wavelength applications.

5. What's the specification of the Ge Etalon?

The etalon is a solid Germanium device which is uncoated giving approximately 40% reflectivity. This would correspond to a reflectivity finesse of ~ 3.3. Surface parallelism is better than 0.01 degrees. The etalon can be used between 2 and 12 um. I've attached an example of the etalon output recorded with a 7um laser.

6. Does the control module (CM-01) include both the CW & Pulse mode current source?

The controller does indeed provide pulsed and CW current source.

7. How is the current/voltage monitored in the full laser system?

A shielded connector is provided for current monitoring. This can be attached to a scope. Voltage is monitored internally by the laser system controller and can be accessed via the on board software. Alternately a scope probe can be used to monitor voltage directly across the diode.

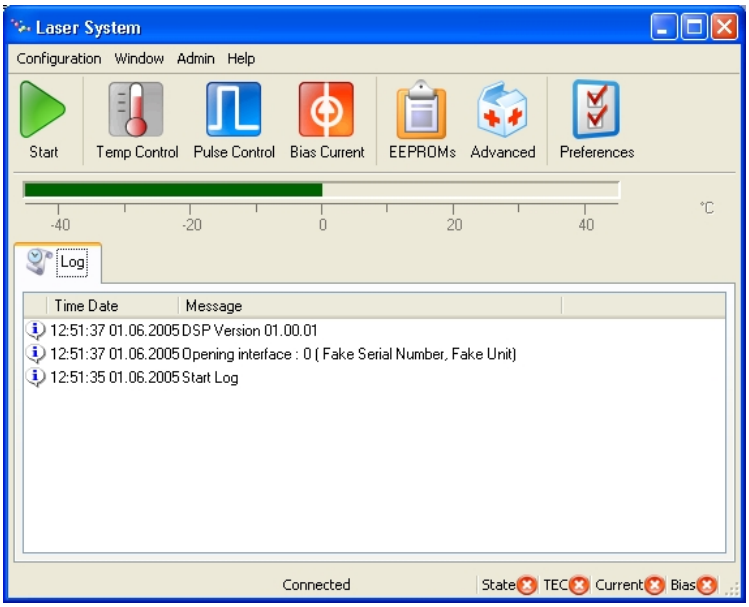
8. Is any software included in the Laser system?

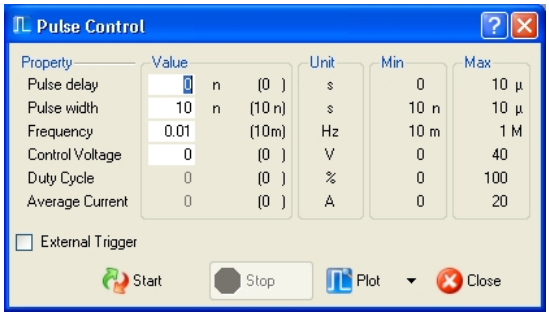
C++ windows based control software is provided. This allows access to all laser system control parameters and engineering data. This includes:

- pulse width
- pulse amplitude
- laser temperature
- current limits etc.

A history of the laser parameters can also be plotted, for example laser temperature, while a command history window allows the user to check previous settings. A Bias ramp generation window for CW operation is provided.

The system is also provided with labview drivers so that it can be easily integrated onto existing experiment set ups. Underneath are some screen dumps to give a feel of the user interface.





9. Do you provide any fibre coupling option?

We are planning to have a fibre coupled option within the end of 2005 depending on customer requirements. This option is compatible with the current optical design and will most probably utilise two sets of our micro optics; one to collimate the beam and one to capture the beam into the fibre.

Glossary and Abbreviations

CW	Continuous Wave: for lasers this means operation with DC current, generating uninterrupted emission.
QCL	Quantum Cascade Laser.
RT	Room Temperature. Meaning temperatures in the range of -30 to +50degC, in contrast to cryogenic temperatures.
TE	Thermo-Electrical: TE coolers use Peltier elements as semiconductor heat pump.
ZnSe	Zinc Selenide