# New Green and Yellow Laser Modules For Multiple Applications and Across a Wide Temperature Range

Produced by Europa Science in conjunction with:

Electro Optics

Frankfurt Laser Company

LASENCE

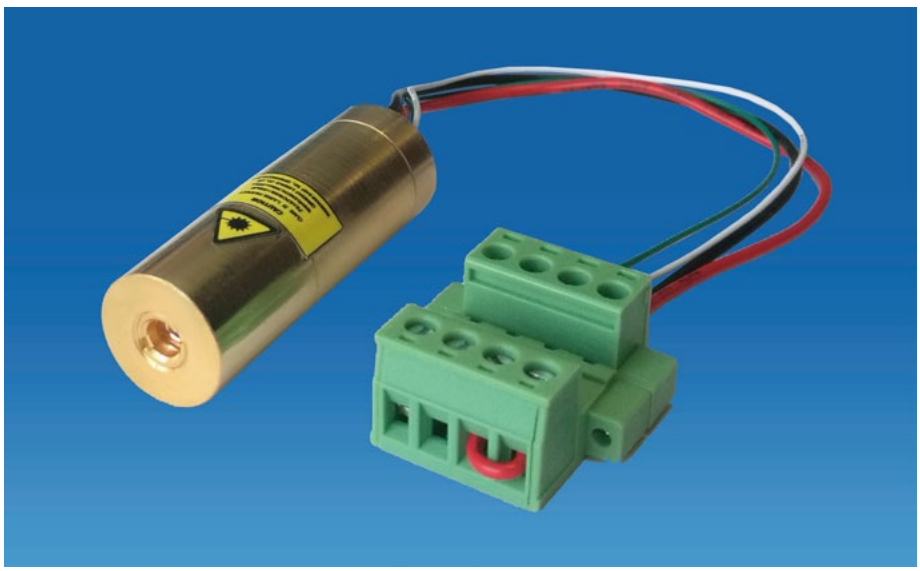
**We can now manufacture 20 million laser modules annually and have been in operation since 2009**

At Qingdao LASENCE, our expert team works in the research and development, production and applications of our Crystal Laser Core (CLC). We provide a range of diode pumped solid state lasers and laser modules based on our unique CLC laser technology.

We can now manufacture 20 million laser modules annually and have been in operation since 2009. The Frankfurt Laser Company distributes Lasence laser modules in Europe exclusively.

Combining our experience and expertise in the laser technology field, our team develops and manufactures the crystals, optics, mechanical systems and circuits to meet the requirements of a range of laser products.

Our latest product launch expands our existing GLM laser series, providing laser modules with a range of new wavelengths in the green and yellow wavelength ranges, capable of providing high output powers while operating across a broad temperature range thanks to our CLC technology.



Our CLC technology works across a wide temperature range. This removes the requirement for additional cooling or heating components

**Introducing CLC**

Many diode pumped solid state (DPSS) lasers rely on sum-frequency technology but this results in complex structures, large volumes and a high-cost for bulk production.

In contrast, self-frequency doubling (SFD) laser crystal modules are more compact, are available at lower cost for bulk production and easier to operate. However, many SFD lasers are still hampered by low output powers and can only operate across a narrow temperature range.

This is where LASENCE's Crystal Laser Core (CLC) can help. It also relies on a self-frequency doubling laser crystal where the crystal combines the properties of a laser crystal and a nonlinear optical crystal.

But our CLC technology works across a wide temperature range. This removes the requirement for additional cooling or heating components, providing even simpler operation and a more compact design compared to other SFD modules.

For example, for existing green laser modules working at the 532nm wavelength, the temperature needs to be fixed at one point to achieve an efficient output because nonlinear crystals are highly temperature sensitive.

Our CLC lasers are not as sensitive to such temperature changes, as shown in Figure 1.

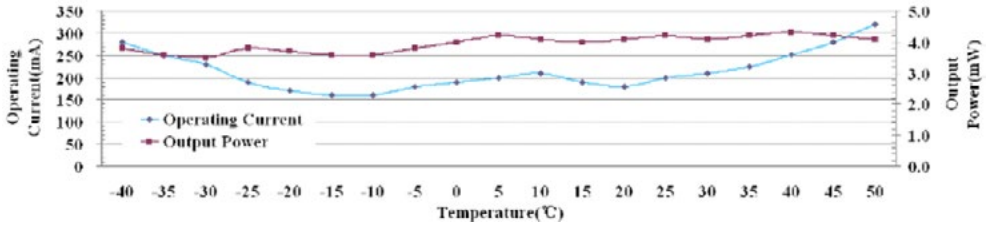



Figure 1: Temperature Characteristics of Nd:GdCOB Green Laser showing the typical output performance with an output wavelength of 532nm, output power of 4mW and temperature range of -40 to 50 degrees Celsius.

**To carry out this service-driven mission, OSC operates leading-edge high-performance computing (HPC) systems**

What's more, and thanks to our unique pump What's more, and thanks to our unique pump source, our laser modules can achieve highly efficient output powers across a range of temperatures and wavelengths between 500 and 600nm.

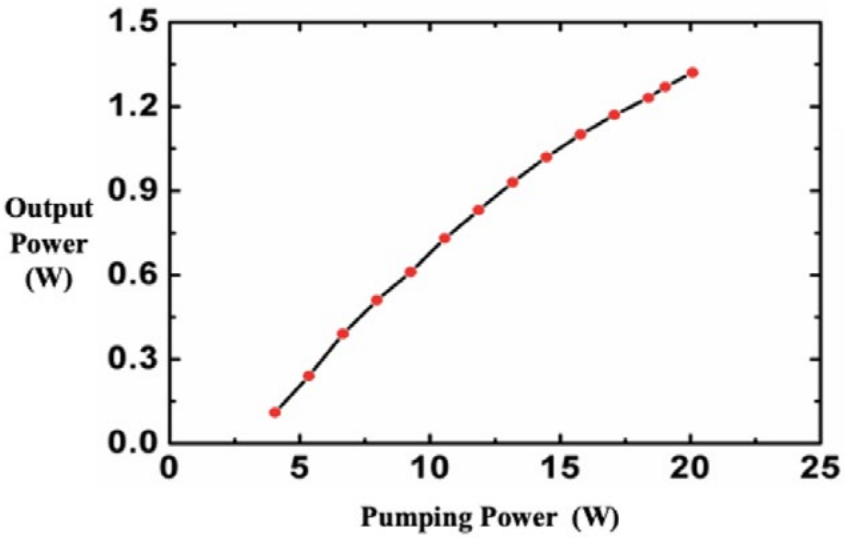



Figure 2: Output power as a function of pumping power for a Nd:GdCOB Green Laser at 530nm, which is capable of a top output power of 1.32W and optical efficiency of 6.5 percent.

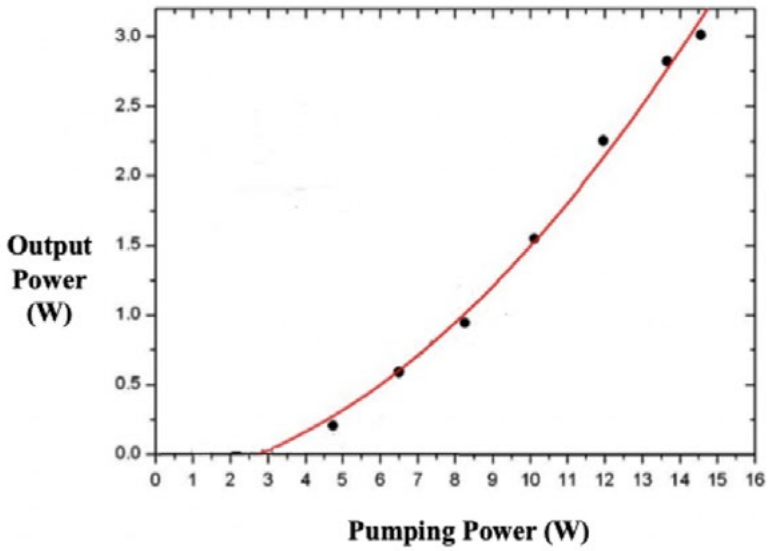



Figure 3: Output power as a function of pumping power for a Nd:GdCOB Green Laser at 545nm, which is capable of a top output power of 3.01W and optical efficiency of 20.7 percent.

These latest additions complement the existing LASENCE GLM series of laser modules, which already provide wavelengths of 532nm and 545nm

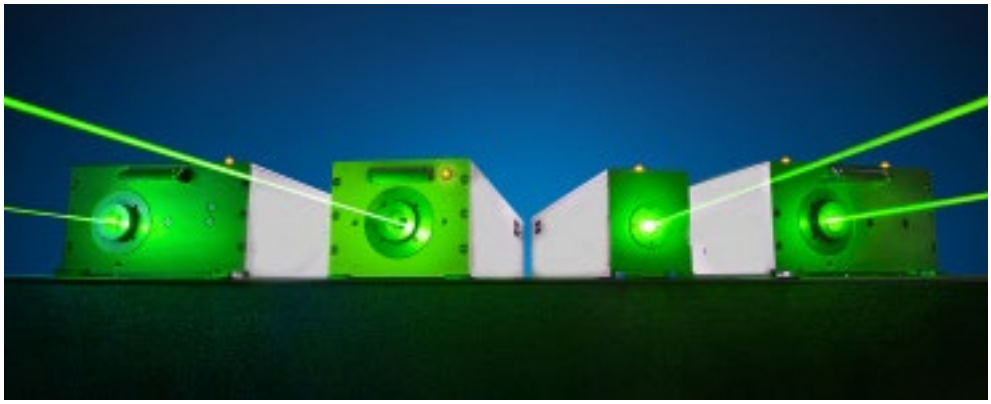
**Introducing our new laser modules**

We recently launched a new series of laser modules, providing wavelengths of 520nm, 555nm, 561nm and 577nm with output powers ranging from less than 1mW to 1.2W.

These latest additions complement the existing LASENCE GLM series of laser modules, which already provide wavelengths of 532nm and 545nm.

The new laser modules come with a typical output beam diameter of 0.5mm and a divergence of ≤40mrad. With dimensions of just 18mm x 55mm (diameter x length), the modules are highly compact while still providing a high output power.

The laser modules also have a wide temperature range of between -30 to 50 degrees Celsius with a fast rise time, while providing superior performance and reliability.



## CFC Applications

Our new green and yellow light laser modules are being used across a wide range of industries and applications. These include:

- **Science analysis and biological detection:** including polymerase chain reaction (PCR) tests, DNA sequencing and biochemical fluorescence.
- **Cytogenetics:** which is the study of tissue, blood, blood marrow or culture cells in a laboratory.
- **Intravital imaging:** to observe biological processes in live animals at high resolution.
- **Optogenetics:** to help researchers understand how areas of the brain connect and work together.
- **Ocular conditions:** including advanced laser surgery for the treatment of macular conditions such as age-related macular degeneration (ARMD), central serous retinopathy (CSCR) and diabetic macular edema.
- **Medical cosmetology:** including skin rejuvenation and freckle removal.
- **Clinical applications:** including robotic surgery, photoluminescence microscopy to identify structures in fixed and live biological samples and endoscopy tests to image inside a body.
- **Industrial applications:** including agricultural applications and to inspect foods and semiconductors.
- **Consumer applications:** including laser indication applications and laser shows to provide stage lighting, laser lighting and laser displays.

To conclude, our unique CLC laser technology and new green and yellow laser modules provide engineers, researchers and other industry professionals with:

- A wide range of wavelengths
- Narrow spectral widths
- High stability

**Our lasers include: Single Frequency Lasers, Low Noise Lasers, High Power Lasers, Compact Size Lasers, Q-switched/ Pulsed Lasers, Fiber-coupled Lasers**

- Compact and easy-to-operate modules
- A wide range of operating temperatures
- Competitive pricing

**About LASENCE**

LASENCE is a high technology enterprise specializing in DPSS laser modules, DPSS lasers ranging from 500 to 600nm and some UV-IR lasers.

Our laser modules include: Wide Temperature Range Green Laser Modules, CW and TTL/Analogue Modulation, Micro Dia3.7mm Green Laser Modules, Fiber-coupled Laser Modules, Ring Laser Modules, Line Lasers, Green Laser Modules and Yellow Laser Modules.

Our lasers include: Single Frequency Lasers, Low Noise Lasers, High Power Lasers, Compact Size Lasers, Q-switched/Pulsed Lasers, Fiber-coupled Lasers.

We have nearly 50 engineers in our R&D Department with extensive experience in the laser and optical industry, who can provide you with customized products and the best laser optical solutions.

To find out more about LASENCE and how we can help you, please contact us at +86 532 66731598, email us at sales@lasence.com or visit our website www.lasence.com.

**About Frankfurt Laser Company**

Frankfurt Laser Company (FLC), founded in 1994 by Dr. Vsevolod Mazo has been one of the top addresses for semiconductor lasers for nearly 25 years. There is hardly a laser product that cannot be found here.

The company offers laser sources from UV, over the visible range, to IR and far-IR, laser diodes, superluminescent diodes, laser modules, laser systems, DPSS lasers or MID-IR LEDs, including single mode and multimode, free space beam and fiber-coupled. Laser diodes available from FLC include all physical types such as FP (Fabry-

**From image processing, to multiple applications in industry and research, to medicine and the military sector - the laser components of the FLC can be found everywhere**

Perot), DFB, DBR, VCSELs, ICL ( Interband Cascade Lasers) and QCL (Quantum Cascade Lasers). Wavelengths available ranges from 266 nm to 16 µm. In the IR range, powers of up to 3000 watts are offered. Furthermore, FLC provides laser diode drivers and diffractive optics (DOEs).

It specializes in custom made laser diode modules with customized wavelength, power and beam shaping, whether point, line or special shapes generated by diffractive and refractive optics. And the product range is constantly growing. From image processing, to multiple applications in industry and research, to medicine and the military sector - the laser components of the FLC can be found everywhere.

To find out more about the FLC, please contact us at +49 (0) 6172 27978-0, email us at sales@frlaserco.com or visit our website www.frlaserco.com.