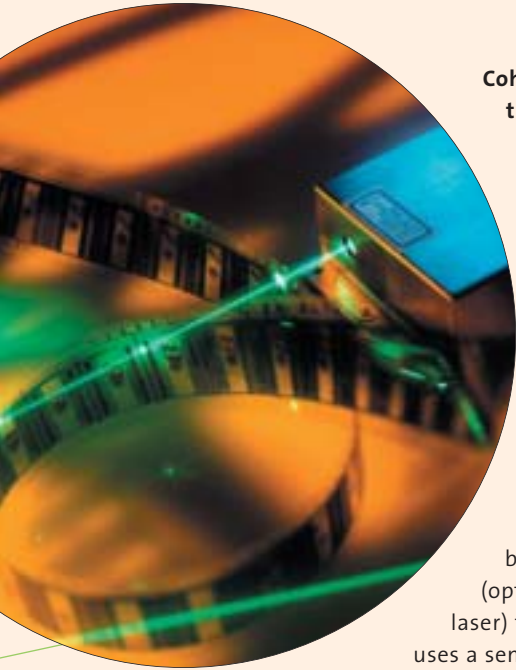


# BREAKTHROUGH IN BLUE

## Sapphire™ 460-10

The Solid-State Revolution Continues at 460 nm



**Coherent Laser Division introduces the new Sapphire™ 460-10, the world's first commercial solid-state 460nm laser.**

This laser provides 10 mW of continuous output power at 460 nm. It shares the identical product platform as Sapphire 488-20, which was introduced last May as the world's first solid state 488 nm laser (see "laserline May 2001"). Both systems are based on the proprietary OPSL™ (optically pumped semiconductor laser) technology. A technology, that uses a semiconductor chip (OPS chip) as the gain medium.

One key advantage of the semiconductor gain medium is the potential wavelength coverage: OPSLs are not limited in wavelength like conventional Nd:YAG or Nd:YVO<sub>4</sub> solid state lasers. In fact, by varying the growth of the OPS chip material, the laser can emit at a predetermined wavelength selected specifically for its commercial significance. More technical details on this revolutionary technology can be found in two recent articles ("Efficiency experts" in the May issue of Photonics Spectra or the bilingual article "Technologischer Durchbruch mit blauen Festkörperlasern/Revolutionary Blue Solid-State Lasers" in Photonik 3/2001). (see attachment)

The new Sapphire 460-10 specifically targets the graphic arts and display market, where 460 nm is the ideal wavelength to represent "the Blue" in RGB applications: It will enable a new era for digital imaging that benefits from a laser source that requires 90% less space, consumes 98% less power and dissipates 98% less heat than a comparable argon laser.

Beyond those integration advantages Sapphire's ultra low amplitude noise performance is important to digital imaging: The human eye is one of the most sensitive instruments for observing distortions on

photo prints, photo film or any other type of color print. Lasers of the Sapphire family feature an amplitude noise of less than 0.25% rms, which meets the stringent performance requirements of graphic arts applications and outperforms the air-cooled argon laser by a factor of four. This particular performance will also result in a considerable cost saving since it allows the elimination of the noise eaters that are currently required to clean up the argon laser's beam."

With the launch of the first Sapphire laser at 488 nm the "breakthrough in blue" has started for bioinstrumentation applications like flow cytometry, DNA sequencing or drug discovery: This autumn OEM integrators will already launch products that have translated the size and performance advantages of the OPSL technology into enduser benefits. This revolution will now continue at 460 nm in the graphic arts and display market.

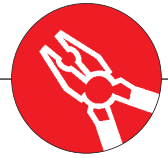
In a broad range of scientific applications Sapphire will allow for a higher level of sensitivity, signal to noise ratio and other improvements. E.g. for Raman spectroscopy the spectral purity of the single frequency output is a strong advantage and certainly will improve experimental results.

Due to the "cutting edge" nature of most scientific applications Sapphires superior beam quality allows for superior experimental results. As other diode-pumped lasers like our Verdi, AVIA or Compass family Sapphire features this excellent performance over the entire system lifetime. There is no degradation like that found in argon tube technology.

With respect to operating costs not only is the long maintenance-free lifetime of diode pumped lasers attractive, but also the saving for energy costs: While comparable air-cooled argon lasers (typical 1500 W input requirement) build up an energy bill of 2.250 Euro (15 Eurocent/kWh) within 10.000 operation hours the energy costs for Sapphire (typical 40 W input requirement) are negligible. Where airconditioning is applied this energy bill will be as much as twice as high. The energy cost-saving is a strong incentive to invest in upgrading existing argon lasers to the Sapphire technology.

**The revolution is here. Join it.**

OPSL™



# Coherent Service Centres in Europe

Many Coherent customers have built up strong relationships over the years with the Coherent European After-Sales Support team. With Service Centres in Germany, France, U.K., Netherlands and Italy staffed by a team of 25 engineers Coherent is able to offer it's customers a wealth of laser experience.

In addition to these Service offices Coherent also operates two manufacturing centres, one in Germany at Lübeck and the other in Scotland at Glasgow. For specific products these sites offer strong support to both European and world-wide laser users.



## Our largest Service Centre is at Dieburg, near Frankfurt.

In addition to 12 engineers and other support staff, the Dieburg facility is well equipped for in-house repair of lasers using it's on-site suite of labs. The Dieburg engineers provide both field-based and in-house support for commercial and scientific customers in Germany. They are also often involved in support of the local Coherent-trained engineers at our Representative organisations throughout Europe.

By maintaining Service Centres in 5 different European countries Coherent demonstrates a strong commitment to customer support, which is all too often lacking from other laser companies. Each Service Centre has in-house repair capabilities and an inventory of commonly used spare parts. This local inventory is supported by a multi-million Euro centralised inventory near to the Dieburg facility. By matching the inventory in Europe to customer needs we aim to meet over 90 % of spare parts orders from European held stock.

**Each Service Centre operates from 9 am until 5 pm Monday to Friday.  
The Service Centres can be contacted as follows:**

Location	Telephone	Fax
France	+33 169 855 145	+33 169 855 146
Germany and Austria	+49 607 196 8225	+49 607 196 8440
Italy	+39 023 453 0214	+39 023 493 4165
Netherlands and Belgium	+31 302 806 060	+31 302 806 077
U.K. and Ireland	+44 135 3658833	+44 135 365 9110

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# laserline

New Coherent Deos Scientific Laser Systems

Coherent Deos Commercial Lasers

Breakthrough in Blue: Sapphire™ 460-10

Coherent in Europe

Focus on Scotland

Thermal Materials Processing

Coherent Service Centres in Europe

## The New Coherent Deos Scientific CO<sub>2</sub> Laser Systems

The Coherent-Deos 50 Watt scientific CO<sub>2</sub> laser brings field proven technology to the laboratory or field applications. Developed over years of testing under severe operating conditions, and designed to be operator-friendly, the Coherent-Deos scientific CO<sub>2</sub> laser offers high beam quality and stability to meet the most demanding requirements.

The RF excited CO<sub>2</sub> laser provides a hermetically sealed, compact housing with superior performance demonstrated in high output power per unit volume and outstanding mode quality. The thermally balanced, engineered design of the waveguide laser head ensures fast turn on under all operating conditions.



### Grating-Tuned CO<sub>2</sub> Laser

**Features:** 9–11 μm Operation | Compact, Rugged Design | Outstanding Mode Quality | Multiple Options: tuneable grating | amplitude stabilisation (+/- 0,25%) | PZT cavity tuner | frequency doubling (4.6–5.4 μm range) | Applications Development Work-Horse

**Applications:** Materials Research: cutting, drilling, surface treatment | ignition | spectroscopy | Process Development | Medical Diagnostics | Laser Radar | FLIR Scene Simulation | Vibration Sensing | Molecular Cooling



### Short-Pulse CO<sub>2</sub> Laser

**Features:** Compact, Rugged Design | Wavelength Selectable (9–11 μm) | < 15 ns Pulse Width | PRF up to 130 kHz | > 10 Watt average power @ 130 kHz | > 6 kW peak power

**Applications:** Laser Radar | IRCM | Material Processing | IR Non-Linear Optics



### THz Laser System

**Features:** Sealed-Off Operation | Reliable Performance | Ultra Wide Operation Range (40 μm to 1000 μm, 7,5 THz to 0,3 THz)

**Applications:** THz Imaging | Remote Sensing | Radar Simulation | Astronomy-LO's | New Diagnostics | Detector Development | Materials Research | Non-Destructive Evaluation/Inspection



the only 100 W air cooled single resonator CO<sub>2</sub> laser source

the only commercial Q-switched CO<sub>2</sub> laser

# COHERENT DEOS Commercial Sealed-Off GEM Series CO<sub>2</sub> Lasers

**The COHERENT DEOS commercial sealed-off RF-excited GEM CO<sub>2</sub> lasers are used for a wide range of OEM applications in electronics manufacturing and materials processing.**

OEM integrators highly appreciate the volume manufactured GEM lasers due to their

**consistent performance, compact size and excellent value.**

Each GEM laser brings outstanding beam quality and stability to the most demanding applications. GEM lasers are among the most compact and lightweight lasers available. Package volumes are

**only 25%–35% the volume**

of competing models. The compact size can be a huge advantage in industries involved in marking or engraving, where “size does matter”.

Compatible with severe industrial environments, current products with output powers of

**25 W, 50 W or 100 Watt**

can be operated either continuous wave or in a pulsed mode. This operational flexibility gives the user a wide range of processing capability. All GEM lasers are available with

**air or liquid cooling.**

Even the 100 W GEM laser can be air cooled. It is

**the only 100 W air cooled single resonator CO<sub>2</sub> laser source**

on the market. Liquid cooled GEM models are best for severe environments and high ambient temperatures. They also provide the OEM user an RF supply combined with a DC supply in a single compact package.

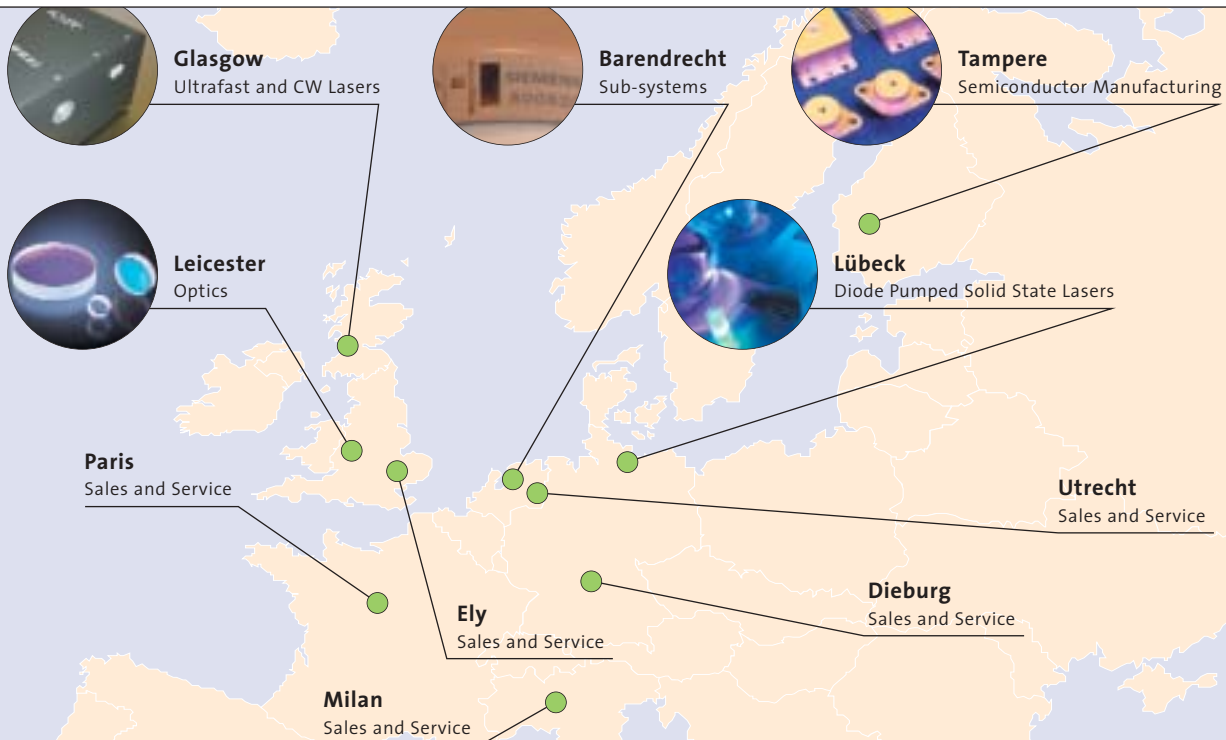
Air cooled GEM models do not need a chiller. This substantially lowers costs. Furthermore installation is made quick and easy – no spills of cooling liquid.

The latest addition to the product line of GEM CO<sub>2</sub> lasers is the GEM-100-QS, being

**the only commercial Q-switched CO<sub>2</sub> laser**

on the market. The GEM-100-QS offers < 150 ns short-pulse and up to 100 kHz high pulse-repetition-frequency capability to the OEM integrator in a compact sealed-off package.

# COHERENT IN EUROPE



**Coherent was founded in Palo Alto California in 1966, in a laundry room as company legend has it! However from an early stage Coherent recognised the importance of the European market and established its first European operation near Cambridge in the UK in 1970, with a single employee.**

Today Coherent has around 1900 employees worldwide (excluding Lambda Physik) of which 390 are located in Europe. The company now has 5 European subsidiary offices providing a high level of Sales and Service support directly to its European customers. Coherent also provides a range of Training, Demonstration and Applications facilities within its European locations.

However, Coherent's presence in Europe is today far from restricted to distribution activities. The company has recognised the deep pool of laser expertise available in Europe and in the past few years has invested in a rapid expansion of its European Research and Development and Manufacturing operations. Coherent currently employs in excess of 50 R&D engineers in Europe. The range of products manufactured in Europe as well as the geographic spread of operations is impressive:

## **Tampere, Finland**

Coherent Tutcore was originally a spin out from the University of Tampere. This 4200 sq m facility hosts 50 employees engaged in the production of semiconductor material for use in Diode lasers and Optically Pumped Semiconductor Lasers (OPSL™).

## **Lübeck, Germany**

This facility employs over 110 people, some 30 engaged in R&D, producing a range of IR, Green and Blue Diode Pumped Solid State and Optically Pumped Solid State lasers. Coherent is currently investing in a building expansion program to add another 2000 sq m of manufacturing space at Lübeck, due to come on line in 2002.

## **Barendrecht, The Netherlands**

Lasertec was founded in 1992 and acquired by Coherent in 2000. The 11 employees have recently moved to a new 750 sq m facility in Barendrecht, south of Rotterdam. Lasertec is dedicated to developing precision laser process solutions for industrial clients and then implementing these solutions into manufacturing environments. Examples of Lasertec solutions include micro-engraving of materials for both security and micromachining applications and the UV cold marking of plastics.

## **Leicester, UK**

Coherent Optics Europe designs and manufactures precision optical components, thin film coatings and optical sub-assemblies for Coherent's internal use and for outside customers. COEL is also Europe's leading manufacturer of thermal imaging optics. This 3200 sq m facility employs over 80 people.

## **Glasgow, UK**

See "Focus on Scotland"

## Focus on Scotland

Coherent Scotland has its origins based in Microlase Ltd, a spin off from Strathclyde University started in December 1992 with a staff of 3. Having grown to around 17 people and following a successful distribution agreement with Coherent, Microlase became Coherent Scotland Ltd. in January 2000. Today it employs 35 people based in an 800 sq m facility, including a Class 1000 cleanroom, on the Kelvin Campus of the West of Scotland Science Park in Glasgow. All aspects of R&D, design, manufacturing and testing are conducted at this facility.

Coherent Scotland specialises in the design and manufacture of technically advanced solid-state laser systems. The products are used worldwide for a range of industrial and scientific applications including semiconductor test and measurement, high resolution laser microscopy, disc mastering and high resolution, time resolved spectroscopy.

Coherent Scotland's current product portfolio includes:

**Ti:Sapphire Lasers**, such as the single frequency MBR-110 and the pulsed Ti:Sapphire laser, "Pulsar".

**Resonant Enhancers**, frequency doubling systems such as the MBD-266 and MBD-200.

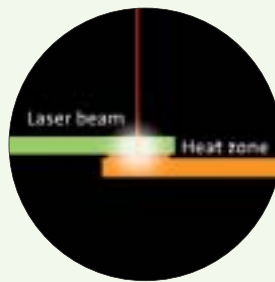
**Ultrafast Diode Pumped Lasers**, including the modelocked DPM-1000 and DPM-1000 PC lasers.

Coherent Scotland has also created **Azure**, a 266 nm CW Deep-UV laser for applications such as Semiconductor inspection, DVD mastering and Fibre Bragg Grating manufacturing.

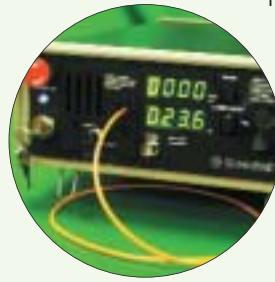
In support of its expansion plans for Coherent Scotland, Coherent has recently started building a new 3000 sq m facility on the adjacent Todd Campus for occupation in August 2002.

# "Thermal" Materials Processing using High Power Diode Lasers

The use of High Power Diode Laser's (HPDL) is increasingly opening up new materials processing applications. The HPDL is without doubt the most useful and flexible tool in applying "heat" or "thermal" energy very precisely in terms of dosage and location.



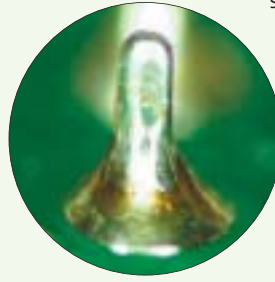
1



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Applications such as plastics welding and soldering in particular are addressed with Coherent fiber coupled HPDL's, at moderate output powers and cost. Coherent's product range of fiber coupled HPDL's covers complete systems of fiber coupled single stripes up to 2.5W optical output power, fiber coupled laser diode bars from 16W to 35W and even systems which contain several of the fiber coupled HPDL modules to achieve multiples of the single-HPDL rated output powers.

Coherent HPDL systems are found in many applications such as for example joining of many absorbing plastics in the Automotive Industry, or in Medical Device Manufacturing, where plastics welding has the advantage of joining plastics without any additional chemicals. This helps in gaining medical regulatory approval of such joined compounds. Soldering applications involving sensitive electronic devices is another example.

Coherent offers application specific Tech-Notes which are available on request. We and our Applications Laboratory are ready to support you and your application.

- ① Principle of laser based plastic welding
- ② 2.5 W F-system
- ③ 80 W FAP-system
- ④ Example soldering

Please contact your local Coherent representative or contact Coherent Semiconductor Division Europe (e-mail: [joerg.neukum@coherentinc.com](mailto:joerg.neukum@coherentinc.com), phone: +49 (0) 60 71 96 82 16, fax: +49 (0) 60 71 96 84 16)