



laserline

LASER 2007 World of **PHOTONICS**

Legend Elite Ti:Sapphire Amplifier

Verdi Green Laser

Diamond CO₂ Family

Xantos XS Excimer Laser

Matrix™ 355

LabMax High Performance Energy Meter

New PulseLife™ Product Family

Coherent displays largest product portfolio ever.
We kindly invite you to visit the Coherent booth
located in hall B3, booth nr. 446

This time Coherent is representing the largest program for lasers and laser diagnostics you can find in the industry. At the quadratic booth with 300 m² 30 Sales and Application Experts will be available to discuss your needs and your application.

The following pages will give you a short preview about product news at LASER 2007.

A special grey scale marking machine will be on duty to create your personal photo smart card.

Coherent's strong presence in Europe.

With over 800 employees Coherent achieves a sales volume of \$ 180 Mio. in Europe. The company 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. Manufacturing sites are in Leicester, Glasgow, Tampere, Lübeck, Göttingen and in Munich.

Coherent is constantly seeking after qualified employees. You can find all open positions at www.coherent.de/jobs

Coherent in Europe:

Tampere, Finland | Semiconductor Manufacturing
Glasgow, UK | Ultrafast and CW Lasers Manufacturing
Leicester, UK | Optics
Ely, UK | Sales and Service
Utrecht, Netherlands | Sales and Service
Lübeck, Germany | Diode Pumped Solid State Lasers Manufacturing
Göttingen, Germany | Excimer Lasers Manufacturing
Dieburg, Germany | Sales and Service
Munich, Germany | Excimer and Solid State Lasers Manufacturing
Paris, France | Sales and Service
Milan, Italy | Sales and Service



Better Ultrafast – Every Day: Legend Elite

A compact Ti:Sapphire Amplifier System with superior Stability and shorter Pulses.

The new Legend™ Elite from Coherent is a one-box regenerative ultrafast amplifier that features major improvements in efficiency (> 3 mJ with the same pump energy) and the ability to generate extremely short (< 35 fs) output pulses. With its integrated Evolution 30 Pump Laser and thermally stabilized RGA cavity, the Legend Elite sets new standards for both passive and active stability in short and long term.

The Turnkey Ultrafast Oscillator, the Micra™ is delivering broad bandwidth (> 100 nm) output from an automated user-friendly package. The compact laser head incorporates both the oscillator and a Verdi™ pump. In addition, the Micra offers center wavelength tunability, as well as a user-adjustable spectral bandwidth (from < 30 nm to over 100 nm), which translate into an adjustable temporal pulse width. The Micra will be available with a full range of accessories and options, including RF synchronization, carrier-envelope phase stabilization and the Silhouette™ pulse shaper to generate < 30 fs pulses from the Amplifier.

The new OPerA-Solo™ is following the proven OPerA concept. It incorporates improved Topas™ Technology with all beam routing, nonlinear options (tuning range 240 nm – 18 Tm), dichroic Beamsplitters on an integrated platform. The “fresh pump” option for Sum-frequency mixings results in better efficiency and beam quality for applications in the visible an UV.

The combination Micra-Silhouette-Legend Elite-OPerA Solo is bringing your ultrafast research to a new Level. Together with the Legend Cryo Amplifier, the system is upgradeable to 12 mJ Pulse Energy @ 1 kHz without compromising reliability.

Applications include:

- * studies in molecular dynamics
- * photochemistry
- * photo-electron generation
- * fluorescence upconversion
- * non-linear optics
- * Carrier Envelope Phase Stabilization
- * High Energy Physics

Verdi, the best high power green laser – is it possible to improve it?

Released in 1996 Verdi showed its superior reliability and performance over the last 10 years. It is the only commercially available laser that is

- * single frequency
- * low noise
- * maintenance-free
- * persistent for many, many years

Therefore the Verdi is the ideal working horse that doesn't limit your application – not now and not in the future. Is it possible to improve that? Did you think about cost of ownership? Within 10 years and sometimes 10,000s of hours we have seen only a few diode failures. This success is based on

- * Al-free diode material (AAA-Diodes)
- * Self-optimization MIN-I system
- * Alignment-free optics (patented PermAlign manufacturing)
- * No fibre bundle
- * Hermetically sealed diode bars and laser head

Nevertheless pump diodes are consumables and at some point in time they need to be replaced.

Therefore the new Verdi V8 and V10 are designed to be pumped by one 880 nm pump diode. At 880 nm thermal lensing is smaller and the efficiency is higher.

This results in a lower power consumption, less consumables and hence a lower cost of ownership. And, as you are used to Coherent products we have extensively tested that technology. It's proven technology.



Self-Contained Excimer Laser “Xantos XS” features simplified Installation and Operation

Coherent has introduced the Xantos XS, a self-contained excimer laser that features dramatically simplified installation and operation.

Specifically, this new excimer laser contains an internal gas compartment, consisting of pre-mixed laser gas bottle and all necessary gas supply equipment for laser operation. This enables automated gas re-filling without external gas and vacuum lines, and meets all international gas handling and safety standards.

In addition, the Xantos XS operates from a single-phase power source and requires no water cooling, making it a “plug and play” tool that can be easily installed and/or simply moved to a new location without the need for specialized support infrastructure. The laser is available at all fluoride wavelengths – 157 nm, 193 nm, 248 nm, and 351 nm – and delivers moderate pulse energies at repetition rates up to 500 Hz. These characteristics make the Xantos XS an ideal tool for both scientific and precision industrial applications.

Based on the field-proven Excistar XS laser, this unique, self-contained laser also features long tube lifetime, high reliability, and long gas lifetimes thanks to its Almeta all metal-ceramic tube technology. This translates directly into very low cost of ownership, in addition to flexibility and ease of use.

With a beam cross-section of 6 x 3 mm and excellent beam uniformity, the laser output can be easily utilized in a wide range of scientific and industrial applications. The concept of an integrated gas compartment is a unique feature in the excimer laser market and makes laser operation as flexible as possible.



MATRIX™ 355, New heights in low power UV

Combining the experience in reliable UV operation of the AVIA and cost-effectiveness of the MATRIX platform, this Q-switched UV light-engine sets the new benchmark in low power UV, starting with a 1 W and a 2W model.

The primary design targets for the first two UV members of the MATRIX platform for OEM integration were compactness, energy efficiency and reliability at a previously unheard of price/performance level. After successful lifetime testing and customer validation COHERENT is happy to announce that all design targets have been met.

Running at a nominal power of 1 W at 60 kHz respectively 2 W at 20 kHz these 355 nm models are built making use of the further improved PERMALIGN™ manufacturing technology and incorporate field proven AAA™ diodes, enabling outstanding beam quality and years of “hands-off” industrial operation. All critical components are built inside COHERENT and thus assure the highest achievable level of process control.

Therefore, when precision and consistency matter a MATRIX™ 355 is the right choice.

Core elements of this next generation UV light source are a separate, organic-free resonator compartment, an all air-cooled design, complete control over timing and pulse energy, combined with a unique resonator setup. When compared to conventional resonator set-ups, the bottom-line benefit is lower cost and better performance. Multiple passes through the frequency mixing stage allow for significantly higher conversion efficiency. It is therefore possible to reduce crystal wear and increase system lifetime. On top of the considerably increased lifetime this set-up allows otherwise not achievable levels of pointing stability and low noise – levels of below 2 % rms Peak-to-Peak noise are typically seen for the MATRIX™ 355.

MATRIX™ 355 – yet another COHERENT laser to redefine consistency and performance for OEM design.



Coherent introduces LabMax, a new high performance power and energy meter that integrates with Coherent's unique position-sensing thermopile sensors and the new line of EnergyMax sensors.

Coherent is proudly presenting the new LabMax Meter at Laser 2007 in Munich.

This is a unique solution in terms of performance and flexibility for the customer that supports position-sensing power measurements and pulsed measurement to 10 kHz. The included Li battery pack and the compact size makes it the ideal tool for field and laboratory use. It can be directly controlled through the ergonomic front panel or controlled by USB, RS232 and GPIB. A LabView Instrument Driver and ActiveX component allow easy integration into measurement environments, and the triggering and synchronization abilities allow for complex experiments.

The meter can be combined with all major Coherent sensors (thermopile, optical, and pyroelectric), and with the newly released EnergyMax series. EnergyMax sensors are available for multipurpose use, as well as specialized measurements on Nd:YAG and its harmonics, UV applications, high repetition rate measurements up to 10 kHz, and at average powers greater than 25 W.



The NEW PulseLife™ product family brings telecom-grade reliability to high power diode lasers

We took telecom grade packaging processes and joined them with our proven AAA™ 808 nm and high efficiency 9xx nm device technology to create the next generation of high power diode pump products. This convergence of technologies extends the versatility and reliability of our high power diode products to give the user; higher operating temperatures, increased output powers, and power cycling, all with commercial level reliability and value.

This new product line includes:

Single bar **PulseLife Conductively-Cooled Packages (CCPs)** that deliver 50 Watts with > 10,000 hours mean time to failure (MTTF). This reliability is maintained even under tortuous "on-off" cycle conditions due to the optimum balance between thermal conductivity and expansion coefficient matched packaging. Available at 810, 940, and 980 nm, PulseLife CCPs are ideal for demanding direct diode applications, such as plastics welding and soldering.

Vertical conductively-cooled **PulseLife G-stacks** with standard 808 nm bar configurations up to 700 Watts pulsed quasi-CW. With a lifetime expectation > 1e9 shots even up to 50 °C heatsink temperatures, these G-stacks set a higher standard of reliability for commercial and defense solid state laser pumping, illumination, and direct diode applications.

PulseLife™ Horizontal Arrays are new water-cooled packages that deliver powers of 80 and 120 Watts CW at 808 nm in two and three bar linear arrays, respectively. These arrays feature Coherent's all-new "macro" channel cooling architecture to eliminate the corrosion problems that have plagued other cooling approaches; enabling a water-cooled package without the cost and complexity of a water condition control system. With a superior lifetime characteristic of > 20,000 hours MTTF, these linear arrays are targeted at side pumped DPSS manufacturers who want higher performance and a lower cost of ownership.





Coherent streamlines Diamond CO₂ family

Sealed CO₂ lasers dominate many materials processing applications, in large part because they offer the lowest cost per watt of any industrial laser technology, together with the broad applicability of their mid-infrared output

Our Diamond family of sealed CO₂ lasers have become the first choice tools in many of these applications because they offer superior stability, excellent mode quality, proven long-term reliability, and fast pulse rise & fall times. We're now streamlining and expanding the entire Diamond product line to support the growth for new CO₂ laser applications. We are developing several new products to reflect changing demands in the marketplace.

The Diamond C family of CW lasers offers output powers up to 70 watts in a fully integrated package, where the RF supply is incorporated within the laser head. While these lasers are commonly referred to as CW, their output can be pulsed at repetition rates up to 25 kHz. These lasers are mainly used in engraving and marking applications. Key demands for these applications are lower purchase cost and smaller footprint, but without a sacrifice in beam quality or laser reliability.

Coherent is meeting the small footprint requirement by using a folded waveguide design, which also contributes to their very fast pulse rise & fall time and delivers excellent beam quality (typical $M^2 = 1.2$). These are major benefits for both marking and engraving, where power on demand and power control are very important in obtaining good results. As reliability is key to grow the market and establish new applications Coherent

champions this area with continuous improvement/corrective action program to identify and eliminate failure mechanisms. Recent developments in this ongoing program have included several advances in the tube design and fabrication which have extended the maintenance-free lifetime of these C series.

The Diamond G & K family is a series of pulsed lasers with output powers in the 100–500 watt range and repetition rates as high as 100 kHz. These lasers offer a very high power/size ratio because they use a slab-discharge resonator design. Moreover, their peak power increases inversely with pulse duty cycle and can be up to 3X the average power. In conjunction with a M^2 value of < 1.3 , this enables processing of tougher materials such as ceramics and thin metals. Diamond G & K-Series lasers service a diverse range of applications, ranging from via drilling to textile, glass and plastic cutting, as well as converting applications such as paper perforating and slitting. In these high-throughput OEM applications, the entire manufacturing system may cost millions of dollars. Consequently, downtime is often a more significant buying consideration.

So, the main market demands are for high reliability, ease of integration, superior beam quality, and support issues such as diagnostic tools and fast field replacement when necessary. One example of how Coherent is responding to these needs is ease of Integration. Specifically, lasers in this power range typically have a separate RF source and a thermally shielded RF cable that must handle many kilowatts of RF power. Eliminating this cable by incorporating the RF source within the laser head can therefore simplify integration and increase laser reliability. An important new series of lasers will be launched at Laser Munich and will premiere this concept at this power level.



New Scientific Field Service Manager for Benelux, Germany and Austria

Since October 2006 Sven-Olaf Soltau manages the GmBV Field Service Group for scientific customers in the Netherlands, Belgium, Germany and Austria. Sven-Olaf has joined Coherent in 2000 and has worked in both Sales and Service roles. He holds a physics degree which he obtained from the University of Konstanz in 1996.



The GmBV Field Service team for the Benelux, Germany and Austria consists of 5 engineers and managers, who support a very wide range of scientific laser systems with more than 50 years of combined laser experience.

The team is based at the Coherent BV office in Utrecht and at the Coherent GmbH office in Dieburg. Service engineers are also located in the field for being as close as possible to the important

universities and institutes. A clear focus is put on providing highest level service and support to Coherent's scientific customer base, all built on a long-term relationship.

Due to the high educational level the GmBV Field Service team can also provide assistance to the customers having demanding applications.

Additionally the Field Service has a strong interaction with the European Tech Support Group, which takes care about large Ultrafast laser systems, having the advantage that Coherent customers get a one-stop service.

With a recently launched initiative customers will start to see new levels of post-sale customer care. This initiative will make the whole process of new system delivery and installation much more transparent to the customer. Says Sven-Olaf "Everything aims at bringing our customers up to speed as quickly as possible, so that our laser systems can do what they were bought for: Enable our customers to do exciting research."

For further information please select your country and send your inquiry to the mentioned e-mail address or give us a call.

See you at LASER 2007!

Coherent Inc.
5100 Patrick Henry Drive
Santa Clara, CA 95054
USA
Phone 001-408-764-4000
Fax 001-408-764-4800
E-mail: tech.sales@coherent.com

Coherent (Deutschland) GmbH
Dieselstr. 5 b
64807 Dieburg
Germany
Phone 0049-6071-968-0
Fax 0049-6071-968-499
E-mail: sales.germany@coherent.com
www.coherent.de

Coherent B.V.
Smart Business Park
Kanaalweg 18 A
3526 KL Utrecht
The Netherlands
Phone 0031-30-280-6060
Fax 0031-30-280-6077
E-mail: coherent.bv@coherent.com
www.coherent.nl

Coherent (UK) Ltd.
St. Thomas' Place
The Cambridgeshire Business Park
Ely, CB7 4EX
United Kingdom
Phone 0044-1-353-658800
Fax 0044-1-353-659110
E-mail: sales.uk@coherent.com
www.coherent.com

Coherent Italia
Via Borgese, 14
20154 Milano
Italy
Phone 0039-02-34530214
Fax 0039-02-34934165
E-mail: sales.italia@coherent.com
www.coherent.it

Coherent France
Domaine Technologique de Saclay
Batiment Azur
4, rue René Razel
91892 Orsay Cedex
France
Phone 0033-(0)-1-69855145
Fax 0033-(0)-1-69855146
E-mail: coherent.france@coherent.com
www.coherent.fr

VISIT OUR WEBSITE:
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