



laserline

Interview with Coherent's CEO John Ambroseo

State of the art manufacturing of CO₂ lasers

Expanded product line for Optical Pumping of Rubidium

Coherent enhances ownership in Lambda Physik

Power-/Energy measurement and Beam diagnostics

COHERENT'S SYNERGISTIC ACQUISITION OF POSITIVE LIGHT

The race to make scientific breakthroughs requires dedication, focus and the productive use of time.

Coherent's synergistic acquisition of Positive Light enables ultrafast researchers to focus more of their time and energy where it matters – on their research.

We offer a complete line of ultrafast products, a tradition of technological innovation, unmatched manufacturing experience, custom laser capabilities, and a worldwide sales and service organization. Now you only need take time from your research to contact a single company to meet all your ultrafast product and service requirements.

It's about time.



JOHN AMBROSEO AND HIS CONCEPT ABOUT COHERENT AS A HIGH-TECH SUPPLIER

JOHN AMBROSEO is Coherent's Chief Executive Officer. From being a scientist in laser research in 1988 at the University of Pennsylvania, John has stepped up through many positions within Coherent into his current role. John is a real "insider" in the laser industry. In the last few years, John Ambroseo has formed the structure of Coherent during a turbulent time of industry downturn and uncertainty in the high tech business. We have reported in a previous "laserline" about the acquisition of Positive Light and Molelectron. In Summer 2003 Coherent decided, to purchase the remaining public stock of Lambda Physik. What philosophy is behind these decisions? Questions to John Ambroseo:

WHY DID YOU DECIDE TO BUY POSITIVE LIGHT?

JOHN AMBROSEO: We knew we had a gaping hole in our portfolio – kilohertz amplifiers. We struggled to decide between developing our own

or making an acquisition, but we identified Positive Light as the best company out there.

We had an opportunity to talk to Positive Light and realized we were a good fit. They bring technology that we don't have and we have techno-

logy that they need. There are opportunities to leverage the supply chain – they are located some 30 km from us and we plan to move them

But it is also about a tradition and expertise to develop innovative products: Evolution was the first high power green Q-Switched diode-pumped laser. Indigo-S and Indigo-DUV were the first diode-pumped tunable, narrow-linewidth lasers to cover the UV spectrum down to 193 nm. Positive Light introduced the first commercial Terawatt laser.



Legend Originally designed by Positive Light more than 10 years ago, Legend is the newest name of the best-selling and recently expanded family of Ti:Sapphire kHz amplifiers. Legend is available in ultra short pulse (30–50 fs), <130 femtosecond, picosecond, and dual versions. The unique Legend is wavelength tunable from 750 to 900 nm. Pumped by our Evolution DPSS laser, Legend delivers outstanding energy stability, beam quality, and reliability.

Libra Imagine a maintenance-free and compact amplified ultrafast system that doesn't demand your valuable time; one that lets you focus on your research. That system is Libra. Libra integrates the celebrated advantages of Coherent's Evolution pump laser, Legend amplifier and Vitesse seed oscillator into a single, software controlled, small-footprint package. Characterized by its integrated, maintenance-free design, ease of use and unique "seed laser-to-OPA" computer interface, Libra is a robust tool that you can count on.

Opera Is it possible to fully and harmoniously automate your entire UF system to save valuable setup time? With Opera it is. Opera is the industry's lowest-noise parametric amplifier, that also provides automated wavelength tuning and optimisation. Using continuum generation as the initiating mechanism for parametric amplification, Opera achieves the lowest possible optical noise, which is especially important when doubling or quadrupling an IR output. When used with Legend and Libra, Opera extends the wavelength range from below 300 nm to the mid-IR. Combined with Libra, Opera offers fully computer-controlled seed-laser-to-OPA performances.



into one of our buildings eventually. The chance to consolidate is beneficial to both companies. And we picked up a terrific group of people and some very talented engineers.

WHAT WILL HAPPEN TO POSITIVE LIGHT'S BRANDING?

JOHN AMBROSE: Typically we look at these things on a case-by-case basis. Positive Light has some very good branding. We will co-brand it for some period of time, but in the long term I'm not sure that having all these different names in the industry is a good thing.

One issue that plagues the photonics industry is that a large number of companies are serving a finite number of customers. The industry needs a few large-scale players. You can try to grow organically or you can do it through acquisitions and then bring all of the functions together so that you don't duplicate efforts.

WHY DID YOU DECIDE TO BUY BACK LAMBDA-PHYSIK?

JOHN AMBROSE: One of our fundamental philosophies is that we should have technology in our

portfolio that solves our customers' needs. In addition, you have to decide how and where to add value to your business.

If you are a technology company, one of the ways that you can add value is by providing unique solutions. In photonics there are few technologies, that produce the kind of performance that you can get out of an excimer. It's a unique technology and important for a number of applications.

Our relationship with Lambda is as the major shareholder, but still a



Evolution – the power engine behind

Ever since its introduction in 1998, Evolution has been the benchmark of excellence in Q-switched DPSS pump lasers for ultrafast amplifiers. Field-proven by hundreds of customers, Evolution enjoys an exceptional reputation for reliability and performance in a power level now up to 90 Watt @ 5 and 10 kHz. With diode laser lifetimes in excess of 10,000 hours, Evolution's diode pumping module is one of the keys to the reliability as well as its unmatched power stability, low noise, excellent beam quality and compact size of this product.



Positive Light Custom Systems encompasses systems from 20 TW/10 Hz to multi-Joule lasers for material processing and "Flyer launchers" for shock wave experiments, macro/micro pulse lasers and regenerative amplifiers. A brochure describing our capabilities is available upon request.



Indigo

Building on the performance of the Evolution pump, Positive light developed Indigo, a family of tuneable and narrow bandwidth systems covering wavelengths down to 193 nm. Available with a large variety of options: SHG, THG, FHG, injection seeding and optional spectrometers, Indigo covers the spectrum of wavelengths as well as of applications: from semiconductor inspection to Raman spectroscopy or combustion studies.

shareholder. In principle the amount of information that Coherent can have access to should be the same as what your average shareholder can get. However, when you are trying to report your results and you can't get all the information you need, it becomes very difficult. Maintaining the relationship we had with Lambda as an independent subsidiary under these conditions was difficult for both companies to manage.

We wanted excimer technology as part of our portfolio. That's what drove the decision.

WHAT ARE YOUR VIEWS ON EMERGING TECHNOLOGIES SUCH AS FIBRE LASERS?

JOHN AMBROSEO: Fibre lasers have been around for a long time and it is a very interesting technology. It fills certain niches, but like a lot of emerging technologies, it is viewed as a panacea that is going to solve every possible need. It certainly has a role to play – there is no question about that – but I think the challenge for fibre laser companies will be how to create differentiation from existing technologies. There's the basic fibre, which you can buy commercially, and then there are the

pump diodes. I don't mean to simplify it down to that level, but there's not a lot of space to create something that is unique. You have to come up with a solution in fibre technology that is unique, difficult to duplicate and has good intellectual property around it. And then if you get into the commodity game, it is hard to build a business on that.

THE INTERVIEW IS AN EXCERPT OF AN INTERVIEW, JOHN AMBROSEO GAVE TO OPTO & LASER EUROPE, OCTOBER 2003



FAP-System



Duo-FAP-System



OEM-Duo-FAP-System

Coherent expands product line for Optical Pumping of Rubidium

For the application of Rb-vapour pumping Coherent offers a wide range of products.

Besides the existing FAP-System which can be specified up to 30 W @ 794,8 nm Coherent now offers a turn-key laser system at the same wavelength with power levels up to 80 W cw.

This Duo-FAP-System is equipped with two independent controllable fibre coupled laser diodes. The laser diodes (FAP-I™ by Coherent) in both the FAP-System and also the Duo-FAP-System are temperature stabilized and can be temperature-tuned separately in 1/10 °C-steps.

By doing so the emission wavelength of both laser diodes can be adjusted independently to a very precise level. Together with Coherent's unique FAP™-fibre coupling technology, which allows achievement of a small linewidth of less than 2 nm (FWHM), this enables the end-user to increase the pump efficiency of the Rb-vapour.

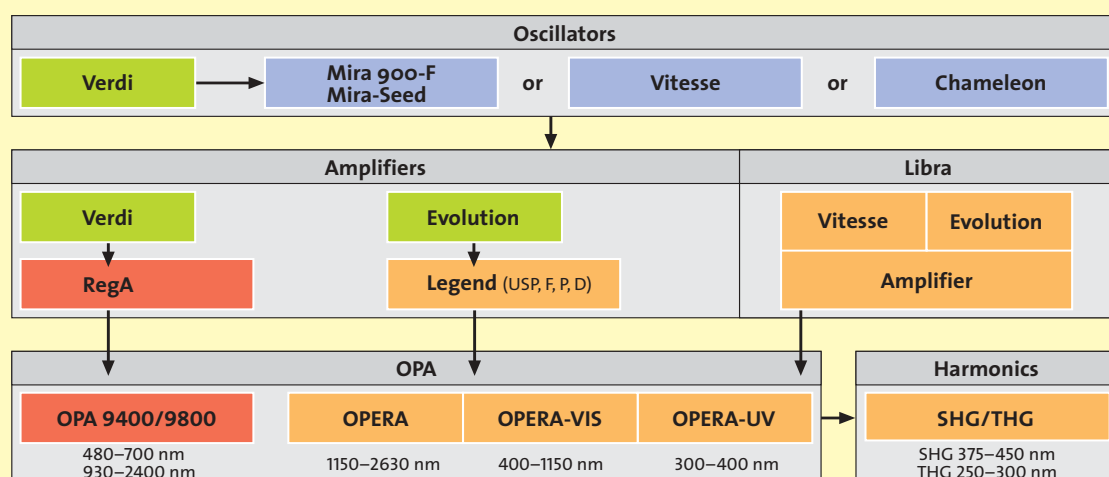
The Duo-FAP-System is also available in an OEM-version where all features are computer controllable only.

Because of the modular design all turn-key systems can be combined with other FAP-I™ laser diodes. Other wavelengths and power levels are available on request.

Contacts:

Coherent (Deutschland) GmbH
Semiconductor Business Unit
Thomas Umschlag
Dieselstr. 5 b
D-64807 Dieburg
diodesales.europe@coherent.com

Coherent's complete UF amplifier solution portfolio





Coherent's new facility in Bloomfield, Connecticut

State of the art manufacturing of CO₂ lasers

Coherent has completed the consolidation of the manufacturing of its CO₂ laser product lines in a new facility in Bloomfield, Connecticut. This single location is a "world class" technology center for all of Coherent's CO₂ activities.

The consolidation process included facility site selection, facility build out, IT infrastructure implementation, employee training and finally the transfer of manufacturing and engineering.

In April of 2001, Coherent acquired DEOS and expanded our CO₂ laser product portfolio by adding the waveguide technology (GEM Series) to our existing slab technology (G & K Series).

This technology allows us to offer affordable, low power CO₂ lasers which are mainly used in marking and engraving applications and the unique q-switched CO₂ lasers used in micro-via drilling and other materials processing applications.

The completely new state of the art manufacturing site ensures high quality manufacturing enabling us to serve our customers with their high volume demand in lasers, leaving enough space to grow even further. Along with an improved manufacturing center, consolidating engineering at one central location provides improved technical support for the development of CO₂ technologies. The single location also allows us to leverage

the site's expanded technical knowledge for the development of new products.

As of September, 2003 all of our CO₂ lasers, the GEM-series from 30 to 100 W, the G-series from 100 to 150 W and the K-series from 150 to 500 W are built in Bloomfield. Not to forget the tuneable CO₂ lasers for scientific use and our governmental research activities.



Coherent enhances ownership in Lambda Physik from 60 to 95 %

Lambda Physik, the well known German Excimer Laser manufacturer will be closer part of the organic growth and internal investment of Coherent.

Coherent has acquired 95% of the outstanding shares of Lambda Physik and is working to take control of the remainder. With the retirement of Dr. Dirk Basting, one of the most engaged and successful characters in the German Laser Business, Coherent CEO John Ambroseo took over the role of CEO of Lambda Physik.

One result of the closer cooperation will be a better exploitation of the synergies existing between different parts of Coherent.

It will bring greater efficiency to the company and help to develop new markets.

Power-/Energy measurement and Beam diagnostics for kHz Amplifiers

Coherent is offering a large range of pyroelectric and thermal heads for Energy and Power measurements of pulsed Laser sources. These can be combined with a choice of several meters, including models which are able to capture every pulse up to 4 kHz.

For measuring systems with 1 kHz repetition rate the 3sigma Power- and Energymeter is the optimum solution. At this repetition rate the 3sigma can still capture every pulse, with the additional capability to measure up to 10 kHz by sampling pulses. The instrument can be controlled externally through freely available LabView based Software. Results can be displayed in several formats including Histograms. 3sigma can also be used with the Coherent-Molelectron PowerMax probes to measure the average Power of your Amplifier. The intuitive, graphical user interface makes the handling simple for any application.

The beam quality of pulsed Lasers is best analyzed by CCD based Camera systems. The ability to measure single pulses depends on the speed of the available electrical shutters. Since the Video repetition rate of the cameras is much slower the shutter has to open and close quickly enough to select just one pulse during one Video period. The Coherent LaserCam II analog based BeamView Analyzer system includes all those hard- and software tools necessary to have a closer look on your Amplifier's beam profile. An updated Software for all BeamView Analyzer Systems supporting a GPIB interface for remote control can be now downloaded from www.coherent.com.

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 00 49-60 71-9 68-0
Fax 00 49-60 71-9 68-4 99
E-mail: sales.germany@coherent.com

Coherent B.V.
Smart Business Park
Kanaalweg 18 A
3526 KL Utrecht
The Netherlands
Phone 00 31-30-2 80-60 60
Fax 00 31-30-2 80-60 77
E-mail: coherent.bv@coherent.com

Coherent (UK) Ltd.
28 St Thomas Place
The Cambridgeshire Business Park
Ely, CB7 4EX
United Kingdom
Phone 00 44-1-3 53-65 88 33
Fax 00 44-1-3 53-65 91 10
E-mail: sales.uk@coherent.com

Coherent Italia
Via Borgese, 14
20154 Milano
Italy
Phone 00 39-02-34 53 02 14
Fax 00 39-02-34 93 41 65
E-mail: sales.italia@coherent.com

Coherent France
Domaine Technologique de Saclay
Batiment Azur
4, rue Rene Razel
91892 Orsay Cedex
France
Phone 00 33-(0)-1-69 85 51 45
Fax 00 33-(0)-1-69 85 51 46
E-mail: coherent.france@coherent.com

VISIT OUR WEBSITE:
WWW.COHERENT.COM

EUROPEAN SITES:
.DE | .FR | .IT | .NL