PHOTONICS NEWS

Company Newspaper of the LASER COMPONENTS Group

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Issue 32

Hollow-core Fibers for the Transmission of CO_2 Laser Light

Patchcord for CO_2 Lasers with Hollow-core Fiber

The transmission of CO_2 laser light is a challenging task for any user. In order to guide the light to the desired location hollow-core fibers are used. However, dust and moisture that enter the fiber are highly problematic.

LASER COMPONENTS developed patchcords that ensure a reliable light transmission. The main part of the patchcord is a hollow silica waveguide with a core diameter of 500 µm, 750 µm, or 1000 µm. The fiber is protected by a metal tube. The metal tube limits the bending radius and protects the fiber against breakage. The two SMA connectors on the incoupling and outcoupling ends are equipped with a zinc selenide (ZnSe) window to protect the hollow silica waveguide against dust and moisture. Optionally, the patchcord is available with a fiber that can also transmit a pilot beam. To connect the patchcords directly to your laser system suitable coupling units are available.

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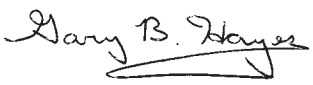
Welcome to the Show!

We are proud to introduce you to many of our new products at the SPIE 2014 Photonics West and BiOS exhibitions.

For starters LASER COMPONENTS is now producing and releasing to the photonics community our new line of standard InGaAs and extended InGaAs photodiodes. Complementing this is our new detector module series called the MAJOR and diamond-like pulsed Infrared Emitters.

As we gather in San Francisco you are invited to stop by our trade show booth #517 to see these and many other components that you may already or soon will be incorporating into your products. Technical representatives will be available to answer your questions and help you discover all the activities of the LASER COMPONENTS group.



Gary B. Hayes
CEO / General Manager

Are You Looking for an Alternative?

850 nm Pulsed Laser Diodes

Our customers have asked – and we have responded: Pulsed laser diodes (PLDs) are now also available at an emission wavelength of 850 nm at LASER COMPONENTS Canada.

The 850 series can be characterized as absolutely reliable; it features a low divergence of 10.5° x 20° and high temperature stability up to +85°C. This PLD has the following parameters:

- Efficiency: 0.9 W/A
- Emitter: 150 µm x 1 µm
- Peak power: 10.5 W
- Pulse length: 150 ns

This PLD is also suited for significantly shorter pulses up to 1 ns.

Alternative to Osram's Discontinued PLDs

The 850D1S06x pulsed laser diodes are available as chip on a ceramic submount or in different housings: TO-18, 5.6 mm, 9 mm, 8-32 Coax. They are thus a viable alternative to the discontinued line of PLDs originally offered by Osram.

Applications. The focus of 850 nm pulsed laser diodes includes applications such as range-finding, speed monitoring, laser radar, security scanners, or laser light curtains. These PLDs are also used in test and measurement systems. The 850 series is the perfect addition to the following established series:

Series	λ	Peak Pulse Performance
850	850 nm	10.5 W
905	905 nm	650 W
1550	1550 nm	45 W

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Insights into LASER COMPONENTS

Management of In-house Development Projects

In 1986, LASER COMPONENTS opened its first in-house production facility and broke early on from its roots as a pure distribution business. Over the years, more and more production facilities have been added, and the collaboration between them has become closer and closer. Our chief technology officer, Dr. Lars Mechold (LM), who has been a member of management since 2012, oversees the successful coordination. He is surrounded by a motivated team that promotes corporate research and development.

LC: Dr. Mechold, how long has LASER COMPONENTS had its own R&D department?

LM: The development of new products began with in-house production in 1986. For a long time, projects were overseen in the individual departments. Since this past year, R&D has been managed centrally. This has opened the door to more synergy and, above all, better implementation of interdepartmental developments.

LC: Was there a specific reason for this change?

LM: Concretely, the development of the single photon counter COUNT® prompted this change. This product was created in a very short amount of time. The heart of this product, the detector, is provided by the LASER COMPONENTS Detector Group in the U.S.A. and the electronic assembly and fiber coupling by our German departments. As a result of our in-house coating design on the integrated lens, the coupling efficiency in particular was improved by 8%.

LC: Was this also the reason for the establishment of a central coordinator position?

LM: Absolutely. The rapid speed of development surprised even us. The potential behind interdepartmental collaboration became more and more apparent.

LC: How do you plan to utilize this potential?

LM: We are currently working on eleven internal and customer-driven development projects that involve our foreign production facilities in the U.S.A. and Canada to some extent. The developers meet once a week to discuss the status of the projects and current issues. We also open these meetings up to the students who are participating in internships or preparing their bachelor's or master's thesis.

We continue to see the positive effect this communication has among our creative employees.

LC: How did you adjust so quickly to your new role as CTO?

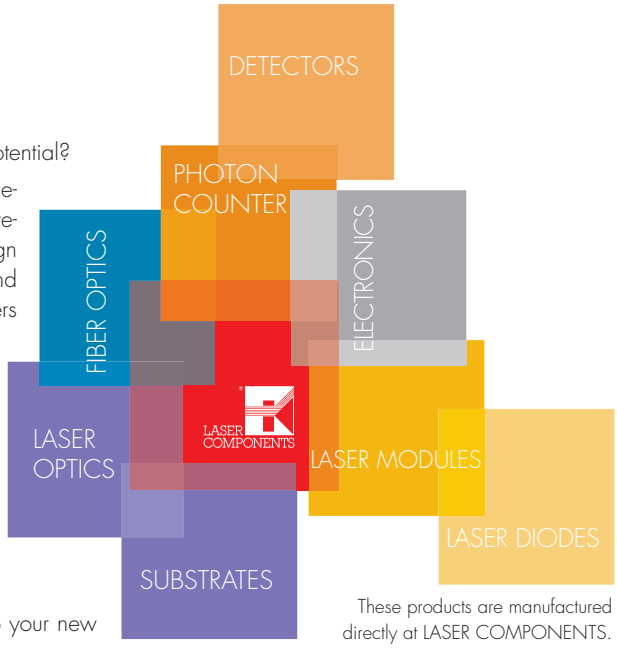
LM: Following my time as a plasma physicist, I worked for eleven years as production manager at LASER COMPONENTS. During that time, I was responsible for the introduction of new products that ultimately landed in production. I have always been able to rely on all the technologies available.

LC: Who is a part of your team?

LM: We have five employees in R&D, three of them are engineers and the other two are physicists. All of our engineers wrote their graduate, Bachelor's, or Master's thesis in house. Each team member has its own specialized area of expertise – from electronics to mechanical and optical design to measurement-based implementation.

LC: Have you already begun to see success in working with this cross-disciplinary team?

LM: Yes. In fact, we have just recently completed a number of development projects successfully.



These products are manufactured directly at LASER COMPONENTS.

This includes a fiber coupler for CO_2 lasers, a digital control for laser modules, the enhancement of our IBS coatings to cover the UV range, and new mounts for laser modules.

LC: How do you come up with concrete product ideas?

LM: Our product engineers remain in close contact with our customers. If our customers reach the limits of feasibility when implementing standard components, we look for concrete solutions.

LC: Let's have a look at the future for a moment. What do you have planned for the years to come?

LM: New ideas will shape my work in the future.

For one, we will continue to optimize internal technical communication lines, which will include regular internal meetings and business travel to the external LC production facilities. We will collaborate more closely and know what expertise each department brings to the table. This is what a medium-sized family enterprise is all about and what sets us apart from large corporations.

For another, we will improve contact to external cooperation partners, which will include participation in conferences and workshops in different disciplines. We will consistently take advantage of the opportunities that are out there. In addition to customer projects, we will also partake in projects with research institutes and universities that yield captivating technologies.

It is quite exciting to return to plasma physics and yet still apply the experience I have gained over the past few years to the implementation of new product ideas.

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520 nm – Available Now!

Real Green Lasers

Effective immediately, all FLEXPOINT® laser modules are available with green 520 nm laser diodes. They are a viable alternative to conventional frequency-doubled DPSS solid state lasers.

These semiconductor lasers, which emit at 520 nm, can be integrated into dot lasers, line lasers, cross-hair lasers, and all of our machine vision lasers (i.e., MVfemto, MVpico, MVnano, MVmicro, and MV12). There are two laser diodes available: one with an output power of 30 mW and the other with an output power of 50 mW. Both laser diodes can be set to operate at lower power levels in production; thus, all power levels of ≤50 mW can be achieved with green FLEXPOINT® laser modules.

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Available With Mixed Wavelengths

Lumics' LuOcean Diode Lasers

Lumics GmbH, Berlin is proud to announce that all diode lasers of the Lumics' LuOcean series are now also available with mixed wavelengths. Customers can choose two different wavelengths built in one casing of the LuOcean Mini, P2, or M2 design.

Two of the wavelengths 808 nm, 9xx nm, 1064 nm, and 1470 nm are combined in one device. Both wavelengths can be switched on/off individually or simultaneously during operation.

Examples for possible configurations could be:

- LuOcean Mini with 808 nm (up to 14 W) & 980 nm (up to 12 W) in 200 µm fiber
- LuOcean Mini with 980 nm (up to 18 W) & 1470 nm (up to 15 W) in 400 µm fiber
- LuOcean P2 with 9xx nm (up to 120 W) & 1470 nm (up to 25 W) in 400 µm fiber.

This novelty is predominantly interesting for customers who are concerned about compact design, for example in medical applications.

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Which Product for Which Application – Part 2

Various Beam Splitters and Their Fields of Application

In this Photonics News issue we will look at somewhat more rare beam splitters.

Beam splitter cubes are used in power separation without beam displacement. The classic beam splitter cube is produced for a certain wavelength and direction of polarization. The heart of the cube is the hypotenuse, to which the appropriate dielectric coating is applied. The surfaces of beam entry and exit on the cube are AR coated, which means that four layers in total are applied to the cube. This explains the relatively high cost of cubes.

Polarizing beam splitter cubes. These components are always used when the laser power can be split via polarization. Cemented cubes are used for lasers with low energy and power densities; they are also available with broadband coatings. Optically-contacted versions are available for high-power applications: Damage thresholds above 10 J/cm² (10 ns, 10 Hz, 1064 nm) are quite resilient. In combination with λ/2 retardation plates, polarization beam splitting cubes can even be used in power regulation.

Diffractive beam splitters are used for precise power separation in high-power lasers: in fact, it is even possible to separate the power into several identical beams (beam matrix). They are commonly used in laser material processing to make holes at precisely defined intervals, for example. With just one compact element, it is even possible to achieve two-dimensional beam matrices of 9 x 9 spots.

UV Coatings via IBS

Ion beam sputtering (IBS) technology is often used for challenging coatings in the Vis and NIR spectral range. It has not been possible to produce coatings for UV wavelengths using ion beam sputtering (IBS) technology because the absorption of coating material was too high.

A new material now makes that possible: For UV wavelengths starting at 260 nm, you may now rely on the many advantages offered by this high-tech coating: The very compact and homogeneous layers not only yield the highest damage thresholds but result in driftless and low-dispersion coatings.

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Pattern Structure with 1 µm Resolution

Patterned colorPol® Polarizers with Improved Specs

With the successful introduction of the colorPol® Polarizer in 2002, CODIXX is now pleased to introduce its newest generation of Patterned colorPol® Polarizers. Utilizing the latest technology, a wide variety of patterns can now be manufactured for each customer's specific requirements, allowing unlimited flexibility of polarizing structures.

Featuring polarization structures with resolution down to 1um, each structure can be custom designed for different optical properties, such as the orientation of the polarization axis or for different wavelengths in the 600 nm and 800 nm range. Extinction ratios greater than 1000:1 and the availability of various shapes and sizes make this unique product a versatile solution for today's wide field of applications.

This new generation of Patterned colorPol® Polarizers exhibit the well proven properties of colorPol® Polarizers, with high temperature stability ranging from below -50 °C (-58 °F) to above +400 °C (+750 °F). Additionally, its resistance

to UV radiation, solvents and most acids and bases make Patterned colorPol® Polarizers a durable choice for the customers' needs.

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New IR Emitters

LASER COMPONENTS Makes Diamonds Glow

Here it is: Introducing the new generation of diamond-like pulsable infrared emitters. The DLSxxxX2224 series has replaced its predecessors, 17-900 and 22-1000. Significant improvements include tighter process control, a longer life expectancy, a broader hot spot, and a signal increased by approximately 30%, in particular at wavelengths above 4.5 µm.

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The diagram shows a sample measurement of the modulation depth in relation to the pulse frequency. This was measured using an IG26X250S4i type extended InGaAs photodiode.