

IPG Photonics Expands Applications Facilities to Reach Across North America

IPG Photonics gives customers easy and regional access to evaluate their specific laser processing need or idea with applications support from coast to coast. IPG has increased its applications lab capabilities by expanding the existing facility in Oxford, MA and adding two new centers in the mid west and west coast. By adding more lab space and state-of-the-art equipment, IPG can provide greater support for existing and future customers.

Potential customers are welcome to visit our apps labs and work with the equipment first hand to prove laser processing as a viable manufacturing solution. IPG's team of experienced applications engineers can guide the customer not only in laser processing, but also part design, fixturing, material selection

and system integration to help create a successful laser process. Our team also provides support for current customers in refining existing and developing new laser processes. Additionally, as IPG's fiber lasers have created power levels and beam qualities never before seen, our apps labs are working to develop new and novel laser based processes for tomorrow's manufacturing.

The applications lab in Oxford, MA has been expanded to over 7,500 sq ft. The new lab is equipped with an ABB 6 axis robot, a VIL Laser System/Wayne Trail Technologies Flex Lase using a Motoman robot with integrated cutting and welding heads, a 6 axis Cartesian CNC system from LaserDyne and two three axis Cartesian CNC systems. The micro machining area now houses a stent cutting system and several galvo based systems. The lasers highlighted are a 20kW CW fiber laser, a 3 kW single mode laser and the new pulsed green laser. The lab also has a complete metallurgical lab for sample evaluation.

The recently opened apps lab in Novi, MI (Detroit area) has 17,000 sq ft of space to service the Midwest automotive and heavy industries. It is equipped with 6 axis robots from Kuka and ABB, a 3 axis CNC system with an integrated galvo head from Preco and remote weld heads from Utica and HighYAG. The lab also has a 6kW CW and 10kW CW fiber laser, a high power single mode laser; and a complete metallurgical lab including an analysis computerized microscope for sample evaluation. The Novi facility features a training classroom for regional laser safety training and welding certification classes.

A third applications lab recently opened in Santa Clara, CA. The 8,000 sq ft lab has micro processing capabilities targeting the photovoltaic and medical industries. It is equipped with a large area 3 axis high speed, high accuracy system with an integrated galvo head from VyTek, a 3 axis Cartesian CNC system and several Galvo based systems. The lasers include a 1kW single mode laser, high power pulsed lasers and IPG's new pulsed green fiber laser.

Whether you are an aerospace company interested in percussion drilling, an automotive company interested in cutting or deep penetration welding, a medical company interested in micro welding or a solar company interested in silicon processing or thin film scribing, IPG's applications labs can help you develop your laser process.

Contact to arrange for free sample evaluation and process development:

Oxford MA: Charlie Bridge, cbridge@ipgphotonics.com +1 (508) 373-1155
 Novi, MI: Eric Stiles, estiles@ipgphotonics.com +1 (248) 863-5001
 Santa Clara, CA: Tony Hoult, thoult@ipgphotonics.com +1 (408) 748-1361



IPG Photonics now Offering Green Fiber Lasers

IPG Photonics introduced two new green fiber lasers- pulsed and continuous wave - at the recent BiOS and Photonics West conferences. These highly reliable air cooled lasers deliver single mode beam quality output at 532nm and are priced lower than competitive green lasers.

Two pulsed green fiber lasers are available with high peak powers and scalable average powers of up to 5W and 10W, pulse duration of only 1ns and frequency of 50 to 600 kHz. With M2 of <1.2 they are ideal for resistor trimming, marking of transparent materials and applications in the solar/photovoltaic arena.

The continuous wave green fiber laser has output power >15W, single frequency linewidth of <3MHz, noise of <1% and M2 of <1.1. There is an interest in using these lasers for pumping Ti:Sapphire lasers and for imaging. Attractive features include low noise, no optics to align, tweak or maintain and low cost to operate. This laser is also well suited for other applications where high coherency and stability of visible laser emission are required.

These low cost, easy-to-use lasers make green lasers more available to a greater number of researchers. Our newest lasers are a direct result of combining our advanced fiber laser platform with the latest state-of-the-art technologies of seed sources and nonlinear converters. IPG's fiber lasers are well known, including record wall-plug electrical efficiency, high beam quality, high reliability, low maintenance, ruggedness, compactness, low weight, and very essential economic advantages.

ALSO IN THIS ISSUE:

Our Highest Power Single Mode Fiber Laser Yet

A Greater Look into our New Green Laser Technology

Even Greater Applications Expansion

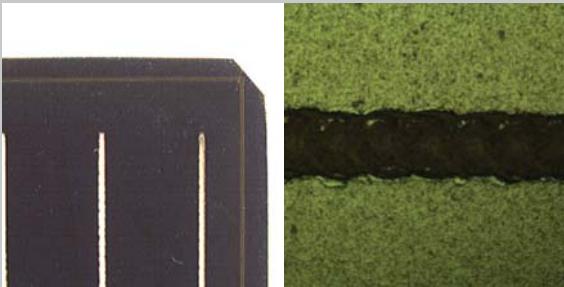
Who's New

Upcoming Events

Fiber Lasers Go Green

Laser material interactions vary at different wavelengths. At 532 nm, commonly known as "Green" in the visible spectrum, the photon energy is higher than that of 1 micron lasers; hence the material removal mechanism is more of a photochemical process rather than a photo thermal process as the wavelength decreases. This kind of material interaction offers superior quality for micromachining and other applications where thermal input to the process is not desired. These characteristics make the green laser suitable for a wide range of applications that include solar cell manufacturing, resistor trimming, marking plastics, micromachining thin metals, polymer ablation and ablation of thin films.

At an output wavelength of 532 nm, the new IPG pulsed 10W green fiber laser (YLP-G-10) provides single-mode beam quality, ease of use and high reliability. Featuring M2 of less than 1.2, the green pulsed lasers have a narrow line width and provide high peak power up to 15kW with scalable average output power up to 10W. The laser operates from 50-600kHz, has a 1-ns pulse width and a maximum of 14µJ per pulse. This novel fiber laser is maintenance free, more efficient, compact and less expensive than conventional lasers now on the market and is built to run 24/7 in demanding industrial environments.



The green fiber laser is being evaluated on a variety of materials and some preliminary findings follow. Scribing on silicon bases PV for Edge isolation has been tested and scribes of 30 micron wide and 5-10 microns deep have been achieved with 4W and 300KHZ. A 532 nm is critical to this application because small kerf width and minimal wafer damage are the most important requirements for the edge isolation process. Other possible applications for this laser include grooving for buried contacts, surface texturing, etc. An application currently tested for thin film PV is for P2 (a-Si) layer scribing. With just 0.1W average power, clean scribing of the a-Si layer is achieved without any damage to the underlying TCO layer. The scribing speeds achieved were 2000mm/sec at a frequency of 100KHZ. Further tests are planned for the P3 (metal) layer scribing, which also requires just 0.1 - 0.5W of power at this wavelength.

The 532 nm laser also offers several benefits for plastics marking versus near-infrared lasers. Initial 532 nm trials on polypropylene (pigmented with different colors) show marking quality appear to be better than those produced with a 1micron laser. The ability to produce a photochemical color change, unaccompanied by any thermal damage like foaming or charring appears to support the case for using a lower wavelength laser for heat sensitive materials and applications. Wire stripping is a process of selective removal of polymer insulation off copper, AL or steel wires for making electrodes or for contacts for miniaturized devices. Removal of such coatings is typically done with cumbersome UV lasers, but most polymers can be stripped clean at 532 nm wavelengths also. A comparison study was conducted to study the effects of ablation quality between 532 nm and 1.0 micron laser and results are shown below.

A 10W green laser is available in our Oxford, MA Applications lab for processing customer samples at no charge. Please contact IPG sales (sales.us@ipgphotonics.com or 508.373.1100) to schedule a visit to our facility or to send samples for evaluation.



532 nm Green CW Laser

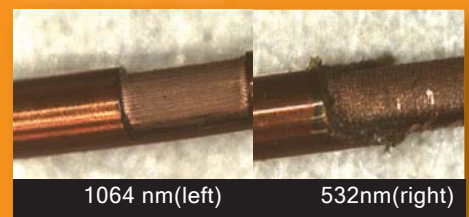
MARKING



1064 nm(left)

532nm(right)

WIRE STRIPPING



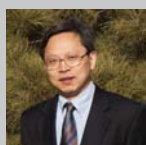
1064 nm(left)

532nm(right)

IPG Photonics Welcomes

Beth Cohen joined IPG Photonics last summer in the role of Marketing Communications Specialist. Beth brings to IPG over 10 years experience in conference development, planning, marketing and sales for Laser Institute of America. Beth's responsibilities include managing all aspects of IPG's tradeshow presence and marketing efforts. (508) 373-1337
bcohen@ipgphotonics.com

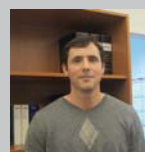
product development, sales and marketing, and new business development. A laser industrial veteran, Dr. Gu has expertise in various lasers, high power and low power, and their applications in aerospace, automotive, medical device manufacturing, semiconductor and microelectronics, and advanced manufacturing. He has published more than 100 papers and articles and has more than 20 patents or applications in the laser field. Dr. Gu currently serves on the Laser Institute of America Executive Committee & Board of Directors. (978) 857-4206
bgu@ipgphotonics.com



Dr. Bo Gu joined IPG Photonics last October as Director of Sales and Marketing- Asia. Dr. Gu came from GSI group and has more than twenty five years of experience in the laser industry. He has held various positions in the past including R&D,

Martin Laguerre recently joined IPG Photonics as VP of Corporate Development, responsible for expanding IPG's business development efforts, strategic direction and M&A activities

globally. Martin brings many years of experience to IPG including principal investing and investment banking at Lehman Brothers, Credit Suisse and DLJ. Martin is also a Chartered Financial Analyst (CFA). (508) 373-1352
mlaguerre@ipgphotonics.com



Michael Lyons rejoined the IPG team this past September as an Applications Engineer. Mike had previously worked for IPG from 1999- 2006 in the manufacturing sector and spent the past two years working for Arcor Laser also as an Applications Engineer. Mike's specializations include high power cutting and welding applications, laser materials processing and a strong background in pulsed lasers. (508) 373-1309
mlyons@ipgphotonics.com

Steven Maynard joined IPG Photonics as a Senior Applications Engineer in mid 2008.

Steve has worked with industrial lasers for over 21 years, most recently with CCA T (Connecticut Center for Advanced Technology) and brings a wealth of experience to the lab. Steve's areas of interest include high power laser applications in the areas of cutting, welding and drilling with both Solid State and Gas flowing lasers, laser materials process development and implementation, customer demonstrations, and customer training. (508) 373-1191
smaynard@ipgphotonics.com



Mike O'Connor joined IPG last spring as the Director of Advanced Applications. O'Connor's previous experience includes fifteen years in R&D, engineering, and business development in specialty fibers and fiber lasers. An Army Special Forces

IPG Photonics Announces New Laser Micro Processing Applications Center in Silicon Valley Fiber Laser Leader Increases Support for West Coast Customers

IPG Photonics is proud to announce the opening of a new 8,000 sq. ft. Laser Micro Processing Applications Facility that will serve West Coast customers. The Facility will concentrate on the advancement of laser micro-processing for the photovoltaic and medical device industries. Located in Santa Clara, California, the heart of Silicon Valley, it will also work with IPG's other applications facilities around the world including Oxford, MA, Novi, MI, Yokohama-shi, Japan, Moscow, Russia, Daejeon, Korea, Beijing, China, Milan, Italy, and Burbach, Germany.

IPG Photonics has named Dr. Tony Hoult, an industry veteran with over 22 years of hands-on laser applications experience, particularly in the field of fiber lasers, as General Manager - West Coast Operations. Dr. Hoult has published and presented extensively throughout his career on laser materials processing. Tony can be reached directly at (408) 748-1361 or thoult@ipgphotonics.com.



Dr. Tony Hoult, GM West Coast

IPG Photonics is already very well known for their ability to develop unique fiber lasers. "I have always enjoyed working with the latest laser technology as this often allows new processing regimes to be identified" said Dr. Hoult. "Bringing these new lasers and process capabilities together will allow IPG to make this facility a unique Center of Expertise for advanced laser micro-processing. We will split our time between internally generated projects aimed at improving our understanding of fiber laser processing, processing customer samples and providing feedback on the performance of the many new fiber laser products that are emerging from IPG Photonics."

Joining Dr. Hoult at the Facility is Jeffrey C. Kabahit who brings over 10 years experience as an Applications Engineer with fiber lasers. He can be reached directly at (408) 748-1348 or jkabahit@ipgphotonics.com. IPG Photonics' new facility is located at 3930 Freedom Circle, Suite 103, Santa Clara, CA 95054, office (408) 492-8830 and fax (408) 748-1376.

IPG Photonics Announces Delivery of Five Kilowatt Single-Mode Fiber Laser to First U.S. Customer Fiber Laser Leader Enters Additional Markets and Applications with World's Brightest Commercial Solid State Laser



IPG Photonics recently announced the delivery of the first five kilowatt single-mode fiber laser to a customer in the United States. This laser represents the latest development in the power scaling of IPG Photonics' patent-pending high-power single-mode fiber laser technology.

The Company's five kilowatt single-mode laser, the YLS-5000-SM is the world's brightest CW solid state laser in production, given the combination of output power and virtually perfect Gaussian beam-quality ($M^2 = 1.2$). IPG Laser GmbH, a subsidiary, previously delivered a similar unit to a European customer. The YLS-5000-SM is a turn-key package that offers a small footprint (850mm x 800mm) and high efficiency, at 22% AC, wall-plug.

Developed for industrial markets, the laser is well-suited for cutting-edge industrial applications. "This level of power and beam quality enables our industrial customers to use fiber lasers for applications which were not previously possible with other lasers, such as assist-free remote cutting as well as remote welding in the automotive, aerospace and shipbuilding industries" said Bill Shiner, Vice President of Industrial Markets. "The increased power and brightness of this laser allows customer to increase processing speeds and eliminate the use of expensive assist gasses in a mobile package."

IPG has also garnered interest in its industrial lasers within defense markets. "There is keen interest within the tactical directed energy market for single-mode lasers having output power in the range of 5kW to 10kW," commented Mike O'Connor, Director of Advanced Applications. "IPG industrial fiber lasers have a reputation for providing high power, reliability, efficiency and ruggedness in a compact package at a low cost. Now with this added combination of high power with near-perfect beam-quality, IPG offers a compelling and proven commercial laser solution for many tactical directed energy applications. IPG can customize the form factor and reduce weight to meet customer requirements."

For more information contact Mike O'Connor, (508) 373-1271 or moconnor@ipgphotonics.com.

veteran, O'Connor holds a B.S. in Physics and a M.S. in Geophysics.
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moconnor@ipgphotonics.com

Milt Vardakis joined IPG in mid 2008 as Director, Business Development Materials Processing and brings to IPG extensive business management, technical problem solving



and strategic partnering expertise from a wide variety of high technology OEM markets. Prior to joining IPG, Vardakis provided profitable sales management and business development results at a Tier-1 manufacturer of industrial-based lasers and diodes. His experience in life sciences, semiconductor, medical, lasers, imaging, sensing, aerospace, materials, component fabrication and instrumentation systems will be an asset to our customers.
(925) 743-1059
mvardakis@ipgphotonics.com

Dr. Tony Hoult, an industry veteran with over 22 years of hands-on laser applications experience, particularly in the field of fiber lasers, joined IPG Photonics as General Manager of the new Laser Micro Processing Applications Facility that will serve West Coast customers. Dr. Hoult has published and presented extensively throughout his career on laser materials processing.
(408) 748-1361
thoult@ipgphotonics.com

Jeffrey C. Kabahit, Applications Engineer joined the Company last October to work with Tony Hoult in the new West Coast Facility. Jeffrey brings over 10 years experience as an Applications Engineer with fiber lasers. Jeffrey's areas of expertise include low power laser applications in the areas of cutting, welding, marking, solar processing with fiber lasers, customer demonstrations, training and support.
(408) 748-1348
jkabahit@ipgphotonics.com

Franck Leibreich joined IPG Photonics as the World Wide Director of Sales and Marketing for all the semiconductors diode laser products. Franck brings extensive laser market knowledge with more than 20 years in the laser and diode laser industry in a variety of strategic marketing and sales positions.
(408) 492 8828
fleibreich@ipgphotonics.com

Felix Stukalin was recently named Vice President of Devices at IPG Photonics. Mr. Stukalin served previously as Vice President of Business Development at GSI Group and was a member of GSI Group Board of Directors Technology Committee. In the past Mr. Stukalin was President of Wave Precision, Vice President of Components and Instrumentation at GSI Lumonics and held technology management positions at General Scanning and Digital Equipment.

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UPCOMING EVENTS

Make Sure to Visit IPG Photonics at these 2009 Trade Shows & Speaking Engagements

TRADE SHOWS

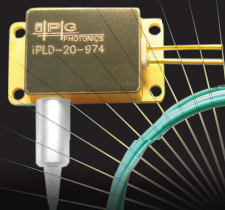
May 12-14	ALAW, Dearborn, MI	
May 18-22	Tennessee Rand, Inc. Automation Technology Expo 2009, Chattanooga, TN	
June 2-4	PhotonXpo 2009-Exhibit at CLEO, Baltimore, MD	Booth #1217
June 15-18	LASER. World of Photonics, Munich, Germany	
June 29-July 2	Solid State and Diode Laser Technology Review, Newton, MA	
July 14-16	Semicon West 2009/ Intersolar 2009, San Francisco, CA	
August 10-12	Directed Energy Test and Evaluation Conference, ABQ, NM	
September 27-October 1	FTTH Conference & Expo 2009, Houston, Texas	Booth #227
October 27-29	Solar Power International 2009, Anaheim, CA	
October 28-30	SCTE Cable-Tec Expo® 2009, Denver, CO	
November 2-5	ICALEO, Orlando, FL	
November 2-6	Annual Directed Energy Symposium, San Antonio, TX	
November 15-18	FABTECH International, Chicago, IL	

SPEAKING ENGAGEMENTS

May 6 - 8	SNEC SPV Power Expo	Disruptive Fiber Laser Technology for PV Cell Manufacture	Tony Hoult
May 12-13	ALAW	IPG: New Products, Trends	Bill Shiner
May 12-13	ALAW	What's New in Fiber Laser Applications for the Fabricators	Randy Paura
June 2-4	CLEO Phast Conference	New Fiber Lasers for Reducing PV Manufacturing Costs	Tony Hoult
June 15-18	LASER. World of Photonics	High Brightness Fiber Lasers for Materials Processing	Tony Hoult
June 29-July 2	SSDLTR	Short Course: Fiber Lasers for Directed Energy Applications	Mike O'Connor

We're not reinventing the wheel
just the engine that powers it.

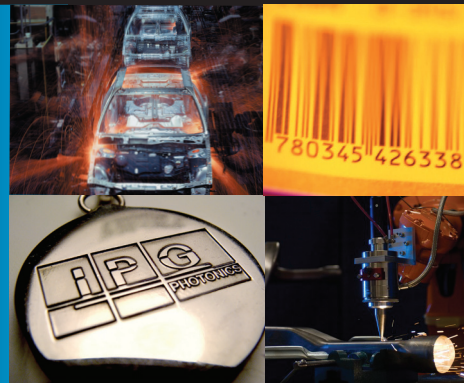
The future is here today with IPG's revolutionary technology incorporating high power laser diodes. Together we have **The Power to Transform™** through reduced risk, an accelerated time to market and lower cost of ownership. **IPG's experienced team will work with you to customize your configurations to assure the optimal solution matched to your requirements.**



High Power Multimode Laser Diodes
Leveraging Proven Fiber Laser Reliability with Single Emitter Technology

Main Features:

- High Brightness: < .12NA
- High Efficiency 20° C: up to 60%
- High Reliability
- High Power
- Low Cost per Watt
- Robust Compact Package



Applications for Dental, Diode Pumping, Direct Diode Lasers & Fiber Lasers, Graphic Arts/ Printing, Life and Health Sciences, Materials Processing, Medical, Microwelding, Photovoltaic and Custom Applications.