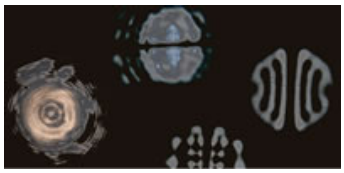
ePulse: Laser Measurement News
September 2021

Welcome to **ePulse: Laser Measurement News**, a review of new developments in laser beam measurements, beam diagnostics, and beam profiling. Each issue contains industry news, product information, and technical tips to help you solve challenging laser measurement and spectral analysis requirements. Please forward to interested colleagues or have them subscribe.

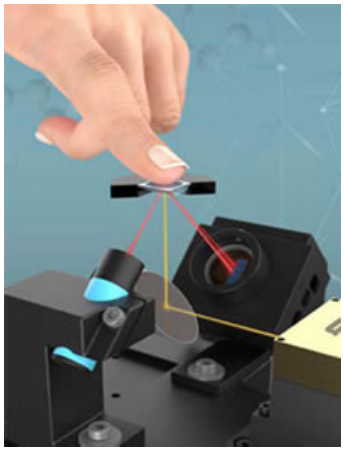
Features

Beam Profiling: What Is Your Laser Not Telling You?
By Kevin Kirkham, Sr. Manager for New Business Development, Ophir



It was not always possible to quickly and easily assess the beam quality of a laser processing tool. Laser beam profiling instrumentation has come a long way over the past few decades, evolving from tongue depressors to Gillettes to non-contact measurement. Today, beam profiling is helping assure quality system builds and avoid poor outcomes in materials processing applications. Beam Profiling.

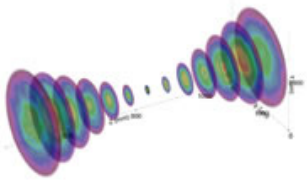
Laser Instead of Finger Pricks: Blood Glucose Monitor Uses M-IR Lasers



For diabetics, the ability to measure blood glucose levels non-invasively would be an enormous relief. Thanks to a patented development by DiaMonTech AG, this dream could soon come true. The technology, which uses an infrared quantum cascade laser, is already available as a desktop device; a smartphone-sized instrument is soon to follow. In order to achieve this miniaturization without loss of quality, it is necessary to detect even minute changes in the laser beam. DiaMonTech.

Applications

Measuring Long Rayleigh Range Lasers with Small Focal Spot



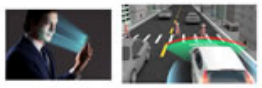
Laser systems used for industrial applications like material processing and micromachining require small focal spots and longer focal lengths. To achieve that, laser systems combining larger beams, lower M2, and longer focal length lenses are used. This results in smaller focal spots at longer distances from the laser and Rayleigh length of up to 20 meters. Here's how to measure them using BeamSquared. Small Focal Spot.

VCSEL Near-Field Profiling and Testing in Production
Combining different testing techniques for optical quality control and characterization - such as VCSEL optical power and energy output measurement, as well as far- and near-field beam analysis - is the most effective way to assure the quality of VCSELs while efficiently attaining production yields. While far-field testing is designed to analyze entire

Videos of the Month

Measure High-Power Concentrated Laser Beams
Now you can measure high power, concentrated laser beams - with very high power densities - from a short exposure, without needing water cooling. Check out Ophir's new power sensor, the L40(500)A-LP2-DIF-35.

Multifunction Integrating Sphere
In many applications, such as VCSEL-based LIDAR and facial recognition systems, there is a need to measure multiple parameters of the laser beam at the same time, such as power, spectrum, and temporal pulse shape. Also, capturing and correctly measuring these widely-diverging and slowly-pulsing beams can be very challenging. The Ophir IS1.5-VIS-FPD-800 Multifunction Integrating Sphere sensor helps you meet these challenges.



Laser Puzzle

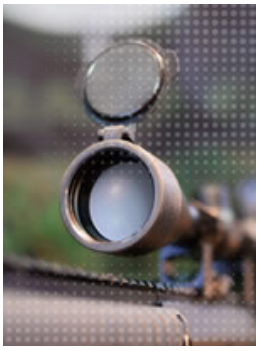
Fancy a walkabout? As you meander, see if you can solve this month's word puzzle. Try your hand at this month's Laser Puzzle.

All submissions will receive an 8GB USB pen drive. The grand prize winner will receive a 16GB iPad. E-mail answers to sales.ophir.usa@mksinst.com. Need a hint? E-mail john@enigmaturge.com.

Here's the answer to last issue's puzzle. Congratulations to the winner of last issue's puzzle - **Shai Shaham, PhD, The Rockefeller University.** "We use an Ophir sensor to calibrate mW power of a 488nm laser beam used for a selective plane illumination microscope. Rockefeller University built this microscope to image embryos of the nematode *C. elegant,* a non-hazardous, non-infectious, non-pathogenic, non-parasitic

VCSEL arrays, near-field analyzers allow testing both entire arrays and individual emitters of a VCSEL die. Near-Field Profling.

IR Solutions for Thermal Weapon Sights and Handheld Thermal Imagers



Ophir's wide range of fixed and manual focus LWIR are light-weight, compact, rugged thermal imaging lenses that provide high precision, durability in the harshest environmental conditions, accurate Line-of-Sight (LOS) with MTF close to the diffraction limit. They are designed for many different platforms, such as handheld thermal imagers and thermal weapon sights, allowing exceptional thermal imaging performance in various environments. IR Optics for TWS and HHTI.

Webinars

Beam Attenuation: Principles of Laser Beam Profiling
Speaker: Dr. Derrick Peterman, Director of Sales, Ophir
Date: September 22, 2021, 1pm EDT / 5pm GMT
One of the more underappreciated aspects of laser beam profiling is correctly attenuating the beam for accurate and reliable measurements. Attendees will learn the various beam attenuation techniques to reduce the beam power down to a measureable level without distorting the beam and when to use each. They will also learn methods to calculate the required beam attenuation level for effective beam profilers. The goal is to help take the guess work out of beam attenuation and ensure the good data is being captured by the beam profiling systems. Register here.

Measuring Laser Beam Power with Photodiode Sensors - How to Get It Right
By Mark Slutzki, Product Manager, Ophir
On-Demand
If you use Photodiode-based sensors to measure your beam power, there are a number of issues that can affect the accuracy of your measurements - in fact, you may not even know there's a problem. In this webinar, you will learn about strange anomalies when measuring low-power pulsed beams (such as beams emitted by VCSELs) and how to overcome them; issues related to beam size and incidence angle; and spectral considerations (small variations here can cause very large reading errors). Photodiode Sensors.

Characterizing Laser Performance from Front to Back
By John McCauley, Business Development Manager, Ophir
On-Demand
Knowing how light interacts with a process is now crucial not only in the development of the process, but in the application, operation, and maintenance of the process as well. This *PhotonicsNEXT* tech talk looks at high-power laser welding of copper, laser-based additive manufacturing processes, automotive LiDAR systems, and how performance measurement solutions have helped solve problems in application development as well as laser operation and maintenance. Laser Performance.

Research News

Cellular Process Mapping Using Commercial Structured Illumination Microscope
Molecular force microscopy (MFM) uses fluorescence polarization to map receptor force orientation with diffraction-limited resolution (~250nm). The authors show that structured illumination microscopy (SIM), a super-resolution technique, can be used to perform super-resolution MFM. The Ophir Starlite meter is used to confirm linear polarization of the excitation laser. SIM-MFM.

Diode-Pumped 10W Femtosecond Yb:CALGO Laser
The authors demonstrate a diode-pumped femtosecond Yb:$CaGdAlO_4$ (Yb:CALGO) laser with a semiconductor saturable absorber mirror (SESAM) for stable mode-locking operation. An Ophir M2-200s is used to measure beam quality, a critical parameter to evaluate laser performance. Femtosecond Laser.

What's New

organism." - *Shai Shaham*

Social Media: Blog

Directed Energy Laser Devices: Advantages and Challenges
Even though the U.S. 1983 SDI program was abandoned with the end of the Cold War, efforts continued to develop and employ directed-energy weapons-with laser-based weapons being the easiest alternative. Here are several clear advantages to such weapons. Directed Energy.

Find the Ideal Measurement Solution for Your Laser Applications
As more and more fields employ optronics, special tools must be developed to ensure that the lasers and light-emitting devices in these applications are precise and perform within a very small margin of error. Ophir has a wide range of beam analysis tools that are the ideal choice for these optronics applications. Laser Applications.

New Catalogs: Power Meters, Beam Profiling, IR Optics

The 2021 Ophir Laser Measurement Catalogs include tutorials and product specifications for laser power meters and beam profiling systems.

The 2021 Ophir IR Optics Thermal Imaging Lenses Catalog covers IR complex lens assemblies for MWIR and LWIR with fixed or motorized focus and zoom lenses.

MKS Newsletters

TECHinnovations Newsletter for the latest on vacuum, power solutions, gas delivery and analysis, plasma generation, and ozone solutions for semiconductor and advanced markets from MKS Instruments.

Focus on Photonics Newsletter for innovations in lasers, opto-mechanical components, vibration and motion control, and laser characterization from Newport Corp.

Trade Shows

Semicon Taiwan
September 23-25, 2021
Taipei, Taiwan

TCT 3Sixty
September 28-30, 2021
Birmingham, UK

PLAS
September 28-October 2, 2021
Taipei, Taiwan

Laser Taiwan
October 20-22, 2021
Taipei, Taiwan

Mittweidaer Lasertagung 2021
November 10-11, 2021
Mittweida, Germany

Industrial Beam Characterization for Long Focal Length Lasers

The Ophir® BeamWatch® Integrated 500 industrial beam characterization system is a fully automated, non-contact laser measurement system designed for automotive and battery welding applications. It works with single mode lasers using long focal lengths, up to 500mm from focal point to power meter. The system integrates both beam profiling and power measurements into a compact, rugged, self-contained device that measures critical laser parameters in real-time, including focal shift, focus spot size, beam caustic, and absolute power. BeamWatch Integrated 500.

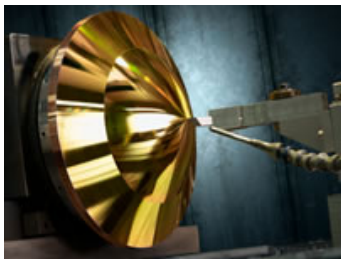
Ophir Optics European Site Receives AS9100D Certification

The Ophir Optics Group facility in Europe (Bucharest, Romania) is now AS9100D certified. The certification recognizes MKS' ongoing commitment to providing innovative, high quality thermal imaging solutions for electro-optical system manufacturers in the global aerospace and defense markets. This certificate is in addition to the AS9100D certification held by the Jerusalem, Israel facility and the ISO 9001:2015 quality certifications held by both facilities. AS9100D Certification.

MKS Instruments Acquires Photon Control

MKS Instruments (NASDAQ: MKSI) has completed its acquisition of Photon Control Inc. (TSX:PHO). According to John T.C. Lee, MKS President and CEO, "We anticipate the acquisition will further advance the MKS strategy to enhance our *Surround the Chamber*® offering by adding optical sensors for temperature control for critical etch and deposition applications in semiconductor wafer fabrication. In addition, Photon Control is a strong strategic fit with similar culture and vision to MKS." Read the press release.

Customized OEM Laser Optical Components



Ophir Optics manufactures OEM customized solutions that meet any specification: components such as mirrors, lenses, windows, in shapes such as spheric, aspheric, or flat, using wide variety of substrates, in wavelengths 1.06µm, 9.3-9.4µm, 10.6µm, and more on request. We bring end-to-end capabilities from design through high-volume production using unique, innovative engineering techniques and cutting-edge manufacturing technologies. Ophir Optics provides optical coating proficiency for outstanding results running strict QA procedures. Customized OEM Optics.

Welcome to New Members of the Ophir Team

Join us in welcoming Wilfried Vogel. Wilfied is our new Regional Sales Manager in France, part of Belgium, part of Switzerland, and Catalunia. He is an experienced sales manager with a demonstrated history in the optics and photonics research industry. Previously, he held sales management and sales engineer positions at Nikon Metrology, AlphaNOV, and Hamamatsu Photonics. Wilfried holds an Engineering Degree in Optics from Polytech Orleans. He can be reached at wilfried.vogel@mksinst.com.

We are also pleased to announce the appointment of Daniel (Danny) Stein as Sr. Manager of Product Marketing for Laser Power Measurement. Danny has extensive experience as an R&D executive in telecom and data communications, including cybersecurity. Prior to joining Ophir, he was

Formnext
November 16-19, 2021
Frankfurt, Germany

Optectnet Jahrestagung
November 24-25, 2021
Hannover, Germany

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Web
www.ophiropt.com/photonics

Head of Product Management at RAD Data Communications. Danny holds an Executive MBA and BSc EE from Tel Aviv University. He can be reached at danny.stein@mksinst.com.

FAQs

Beam Profiling
Do you need to correct for the optical path length difference in an Ophir FSA system when you change the attenuation? Read the FAQ.

What is the tilt accuracy and tolerance of the BeamWatch AM? Read the FAQ.

Power Meters
In the datasheets of photodiode-based energy sensors like the PD10-C, the lowest measurable energy is given specifically for one wavelength - 900nm. How do I know the lowest measurable energy at MY wavelength? Read the FAQ.

Can the Helios Plus measure power-from-short-exposure correctly for a pulsed beam, say pulsing at several KHz? Read the FAQ.

About Ophir

Ophir is a brand within the MKS Instruments Light & Motion division. The Ophir product portfolio consists of laser and LED measurement products, including laser power and energy meters, laser beam profilers measuring femto-watt to hundred-kilowatt lasers, high-performance IR and visible optical elements, IR thermal imaging lenses for defense and commercial applications, and OEM and replacement high-quality optics and sub-assemblies for CO_2 and high-power fiber laser material processing applications. Dedicated to continuous innovation in laser measurement, the product portfolio includes the **R&D 100** award-winning **BeamTrack** power/position/size meters and Spiricon **Ultracal™**, the baseline correction algorithm that helped establish the ISO 11146-3 standard for beam measurement accuracy. The company is **ISO/IEC 17025:2005** accredited for calibration of laser measurement instruments. The company's modular, customizable solutions serve semiconductor, industrial, life and health sciences, research, and defense industries throughout the world. An ISO 9001:2008 Registered Company.

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