ePulse: Laser Measurement News

The true measurement of laser performance

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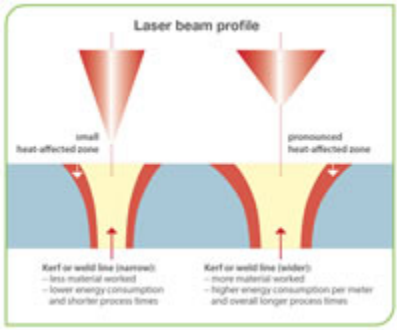
May 2021

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

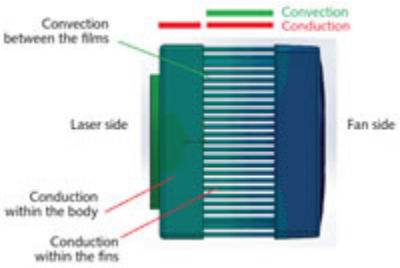
The Challenge of Battery Production



Automakers are investing heavily in electric cars and the technologies of e-mobility are tightly linked to laser welding. The goal is to achieve a consistently high level of production quality while continually guaranteeing and documenting this and/or to glean insights from the observed irregularities. This article explores where the challenges lie and why the quality of the laser beam plays such a pivotal role in the digitalization of manufacturing processes. Battery Production.

High Power Laser Measurement: Cooling Methods

By Asher Izsak, Mechanical Engineer, Ophir



When selecting a laser power measurement sensor, choosing the right heat-control method for the sensor is a key consideration. To aid in such a choice, this *Laser Focus World* article reviews the different cooling technologies used in high-power laser measurement sensors. It also examines the changing requirements of the cooling system as the power levels of the laser increase, and considers how these are met by fan and water cooling methods. Water vs Fan Cooling.

Speeding Up End-of-Line Quality Testing for Lasers

Reliability and safety demands place increasing responsibility on manufacturers of laser systems. To ensure the high quality of each laser system, thorough end-of-line testing is mandatory before a laser system is delivered. Yet, as with many industries today, competition is high and manufacturers are seeking to balance cost-effective production with high-quality standards. Using the Ophir® BeamSquared® system, end-of-line-testing for laser systems can be performed much faster and the process can be optimized. End-of-Line Laser Testing.

Videos of the Month

Ariel: Ultra-Compact All-in-One Sensor for High Power Industrial Lasers to 8KW

Designed for use in closed and confined spaces, such as AM and metal cutting, the Ariel power meter is a robust, battery-powered device that requires no water or fan cooling and is small enough to fit in the palm of your hand. Measures laser powers from 200mW to 8KW, at a wide range of wavelengths, including 440-550nm green and blue lasers. Video: Ariel.

PD300RM-UVA Irradiance and Dosage Sensor

Now you can measure irradiance and dosage in applications using broadband UV and visible LEDs. In this short video, you'll learn what the Ophir PD300RM-UVA does and how to use it. Video: PD300RM-UVA.

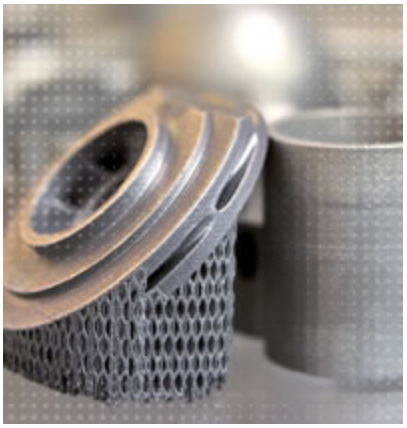
Laser Puzzle

Try your hand at this month's Laser Puzzle. Solve this Tsunami puzzle to find an image of equipment you might use to measure the power of one of your lasers. You might need your imagination for this one.

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

Applications

Smart Measurement Technology for Lasers in Additive Manufacturing



Laser-based additive manufacturing has transformed many industrial processes. One of the most challenging tasks is to ensure reproducibility from one layer to another, between multiple laser sources within the same machine, and from one machine to the next. The good news is that the Ophir product portfolio features a variety of devices specifically for additive manufacturing. Here's what you need to know about power measurement, slit-based beam profiling, camera-based beam profiling, and beam caustic measurement. Lasers in Additive Manufacturing.

Why Does an Individual Calibration Pay Off?

Measurement devices for lasers are used in many different applications and industries, which means a vast amount of calibration regulations. While regular calibrations are mandatory in the medical sector, they tend to be neglected in other industries. It's important to understand that calibration not only ensures the quality of the measurement in terms of repeatability, the individual calibration of a measurement device can also increase its absolute measurement accuracy. Calibration.

Webinars

Measuring the Power and Beam Profile of Divergent Light Sources

By Derrick Peterman, PhD, Sales Director, Ophir
Date: May 20, 2021, 1pm EDT / 5pm GMT

Lasers with large beam divergence create challenges for reliably characterizing lasers primarily because the beam size from such lasers grows quickly over a short distance, and beam conditioning optics and sensors used to measure these beams can have a strong angular dependence. In this *Photonics Spectra* webinar, we will discuss methods for reliably characterizing the beam power and profile of divergent sources, so that users will be able to better understand how their lasers are performing in critical applications. Register here.

Materials Processing: Lasers, Optics, and Testing

Speakers: John McCauley, Business Development Manager, Ophir, and Scott White, Director of OEM Product Marketing, and Jim Bovatsek, Applications Lab Manager, Spectra-Physics
Date: June 8, 2021, 1pm EDT / 5pm GMT

Tens of thousands of YAG, diode, and fiber lasers are deployed in demanding manufacturing applications, from cutting steel, to drilling via holes in silicon, to marking plastic. A whole range of material processes now make use of lasers to produce results not previously practical. In this *Laser Focus World* webinar, we will discuss the special demands of material processing applications for lasers, optics, and measurement. Register here.

Characterizing Laser Performance from Front to Back

By John McCauley, Business Development Manager, Ophir
Date: June 23, 2021, 11:30am EDT / 3:30pm GMT

Knowing how light interacts with a process is 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 will look

john@enigmaturge.com.

Here's the answer to last issue's puzzle. Congratulations to the winner of last issue's puzzle - **Marty Tryba, Preco, Inc.** "I recently used (for the 1st time) the StarLab application (with a FL400A-BB-50 power sensor and a Juno USB interface) for monitoring the output of an air-cooled 300W fiber laser. The software was easy to configure, and the functions were plentiful." - *Marty Tryba*

Social Media: Blog

What if the Laser Power Sensor You're Looking for is Obsolete?

Ophir periodically releases new sensors as old sensors become less relevant. New sensors provide improvements, such as better wavelength coverage or power range, higher absorption, better damage threshold, or more uniformity and accuracy. If you need to replace your laser power sensor, but can't find it on our website, check to see if it has been discontinued. If so, you can see our recommended substitute. Power Sensors.

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

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. Register here.

On-Demand Webinars

How to Choose the Right Power Meter and Sensor to Measure Your Laser
Speaker: Mark Slutzki, Product Manager, Ophir
You have some experience with lasers - enough to know that you want to verify its performance; so you start looking for a tool to measure the laser's power or energy. How does one choose the appropriate type of sensor, and meter (display)? In this webinar, you will learn what type of sensor to use for what type of measurement, how to decide on a meter, and tools available to help you choose. View now.

Defense & Security: Lasers, Optics, and Testing
Speakers: John McCauley, Business Development Manager, Ophir; Dr. Kobi Lasri, General Manager, Ophir Optics; and Taguhi Dallakyan, Product Marketing Specialist, Newport
The development of new weapons, unmanned aerial systems, aircraft vision systems, and drones comes with challenges that users of lasers have been addressing for years, although now with additional constraints, such as much higher power scales for military use, and significant size and weight reductions for aerial use. In this webinar, we will discuss the special demands of defense and security applications for lasers, optics, and measurement. View now.

Optics and Coatings Technology
Speaker: Dr. Peter Kunert, European Sales Manager, Ophir Optics
Precision optics are used in a wide variety of industrial, scientific, medical, and military applications. But how do you know what types of optics will work best for your application (e.g., spheric vs. aspheric, etc.) and which coatings will deliver the optimum performance? This 60-minute webinar from *Tech Briefs* examines what you need to know to answer those questions. Topics include: key IR thermal imaging trends and application drivers, advanced IR optical assemblies for UAVs, drones, and surveillance applications, and unique folded-optic design technology for continuous zoom lenses. View now.

Reduced SWaP Zoom Lens Designed for MWIR 10µm VGA FPA
Speaker: Dr. Nissim Assida, R&D and Engineering Director, Ophir Optics
Introducing Ophir® LightIR 16-180mm MWIR f/3.6 continuous zoom lens, the newest addition to the successful LightIR family of lightweight, long-range, motorized continuous zoom lenses. The LightIR 16-180mm f/3.6 folded zoom lens addresses the new market shift toward smaller size detectors. With its disruptive combination of size, weight, range capabilities, and cost, the new zoom lens is an enabler for advanced drone, UAV, and small gimbal thermal imaging applications. View now.

Research News

Fs Laser Induced Thermophoretic Writing of Waveguides in Silicate Glass
Femtosecond laser writing is a versatile tool to produce multipurpose photonic devices in glass. Its effectiveness relies on strong-field ionization to produce modification in otherwise transparent dielectric materials. Here we look at the application of infrared optical waveguides. The Ophir PD300 photodiode sensor is used for losses evaluation. Waveguides.

Reduction of Thermal Quenching Effect
Phosphor converters for solid state lighting applications experience a

ALAW: Advanced Laser Applications Workshop
June 1-3, 2021
Virtual Conference

Anwenderforum: Additive Produktionstechnologie
June 10, 2021
Virtual Conference

MKS World of Light and Motion
June 21-24, 2021

Xponential, Atlanta
August 16-19, 2021
Atlanta, USA

Automation Taipei
August 19-22, 2021
Taipei, Taiwan

CIOE (China Int. Optoelectronic Expo), Shenzhen
September 1-3, 2021
Shenzhen, China

Semicon Taiwan
September 23-25, 2021
Taipei, Taiwan

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

ADEX, Seoul
October 19-24, 2021
Seoul, Korea

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strong thermal stress under high-excitation power densities, such as in laser diode based lighting. This research presents an effective approach to reduce the thermal quenching effect and damage of laser-excited phosphor-silicone converters using thermally conductive hexagonal boron nitride (hBN) particles. Excitation power is measured using the Ophir Nova power meter. Thermal Quenching.

What's New

Industrial Laser Power Meter for Blue, Green Wavelengths

An expanded version of the Ophir Helios industrial laser power meter, Helios Plus, measures high power industrial lasers up to 12kW and, for increased flexibility, provides a wide range of wavelengths including 450-550nm (blue/green) and 900-1100nm (infrared). This is especially important in the automotive industry where heat conduction welding with blue and green lasers is becoming the first choice for battery welding and connecting small copper parts in electrical components. PROFINET, Ethernet/IP, and RS232 communication options make it easy to integrate into manufacturing networks. Ophir Helios Plus.

Integrated Solutions: Interconnecting Ophir Products & Accessories

Customers often need to connect different optical components to create an optimal setup to best meet their needs. Ophir provides mutual interconnections between different Ophir products via adapters with various threads, designed to exactly fit required optical path distances for each device. Find out more about these integrated solutions, pre-aligned and ready to use.

Folded-Optics Zoom Lens for Drones & Small Gimbal Applications

The Ophir LightIR 16-180mm MWIR f/3.6 continuous zoom lens is a compact, thermal imaging lens optimized for smaller size 10µm pitch VGA FPA (focal plane array) detectors. It features a folded optics design that significantly reduces the length of the lens and, therefore, the overall size and weight of the optical system in which it is incorporated. The lens is 65% smaller than existing MWIR (medium wave infrared) 10µm VGA lenses. With its disruptive combination of SWaP capabilities, detection range over 13+ km, and cost-effective pricing, the new zoom lens is an enabler for advanced drone, UAV, and small gimbal thermal imaging applications. LightIR 16-180mm.

Ophir 2021 Q1 Catalogs Now Available

Find information on the latest developments in laser measurement products from Ophir in the new 2021 Laser Power & Energy Measurement catalogs. Special editions focus on Power/Energy Meters, Power/Energy Sensors, Beam Profilers, PC Interfaces, Software Solutions, and more.

Download your copy today. Ophir 2021 Q1 Catalogs.

Technical Tips

I've heard that an integrating sphere can be used as a spatially uniform light source. How would that work? Read the Tech Tip.

FAQs

Power Meters
How do I set the Ariel to the 8KW range? I only see ranges up to 500W, but the spec says it can measure up to 8KW. Read the FAQ.

In the specs of the Pulse Characterization Sensors, Noise Equivalent Power is specified in units of √ Hz. What does that mean? Read the FAQ.

Can I replace a damaged diffuser myself? I don't see diffusers listed on the Accessories page. Read the FAQ.

Beam Profiling
I have found some old Ophir/Spiricon/Photonics equipment in my lab. Can I get help getting it working again? Read the FAQ.

What is the sampling resolution of the NanoScan? Read the FAQ.

Optics
How does the LightIR 16-180mm f/3.6 conform to SWaP constraints? Read the FAQ.

Why are SWaP constraints important in drone and UVA applications? Read the FAQ.

How does Ophir meet Naval and Maritime applications EO system challenges? 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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