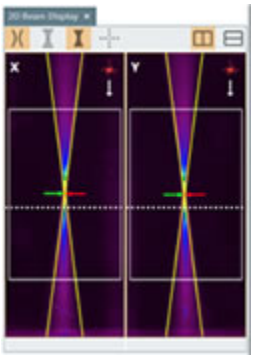
ePulse: Laser Measurement News
November 2021

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

Why and How to Profile Challenging Laser Applications

By Kevin Kirkham, Sr. Manager for New Business Development, Ophir



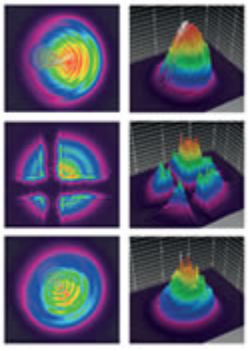
We introduce three techniques for monitoring the critical characteristics of the beam as the laser is used in three very different - and often challenging - applications: (a) VSCEL/Laser Diode Mode and beam divergence, (b) Additive Manufacturing lasers used is 3D SLM/SLS, and (c) Fiber welding/heat treating/cleaning lasers. Beam Profiling.

High-Power Lasers and Industry 4.0: Focusing on Knowledge

Industry 4.0 is revolutionizing manufacturing processes. New digital technologies are being integrated into operations and the world of high-power lasers is no exception. Innovative techniques now allow for fast measurements of lasers in automated production environments as well as contact-free measurement of focused laser beams in automotive and industrial micro-machining applications. High-Power Lasers.

Applications

Ensuring Quality of Medical Lasers



The fields of aesthetic medicine, surgery, and cosmetics have been revolutionized by laser technology. With the development of innovative laser systems, Asclepion Laser Technologies contributes to patient well-being and faster healing. To adjust their PicoStar® laser, Asclepion measures and analyzes the beam profile of this pico-second laser using an Ophir CCD camera combined with a beam reducer. Asclepion.

Things to Remember When Setting Up Laser Measurement Equipment for the First Time

By John McCauley, Business Development Manager, Ophir

Measuring the performance of your laser is vital to understanding its behavior and maintaining the processes it is involved in. But familiarizing yourself with the products that perform these measurements can be overwhelming. This article discusses how to understand the way your

Video of the Month

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. Also, measuring widely-diverging and slowly-pulsing beams can be challenging. Here's how the Ophir IS1.5-VIS-FPD-800 Multifunction Integrating Sphere sensor helps you meet these challenges. Integrating Sphere.

Laser Puzzle

Bicycle "track" racing is typically performed on a closed oval track called a vélodrome. Can you keep your balance long enough to solve this month's 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 - **Rich Shea, Brown University.** "I provide Laser Safety. The researchers we work with use Ophir equipment to measure laser power and energy to determine if the current safety measures are adequate or if we need to adjust the measures. They also use Ophir beam dumps to prevent any beams from leaving the table. I love the monthly newsletters and the brain teasers; they are very challenging and fun to work

laser behaves and provides tips for setting up beam profilers and power sensors for the first time. Measuring the First Time.

Thermal Imaging Optics for Defense Applications

Ophir Optics' advanced, compact, and lightweight IR thermal imaging lenses are critical for airborne missions, enabling high quality imaging performance without a heavy toll on the UAV payload. Meeting strict SWaP constraints, withstanding harsh environmental conditions, providing long DRI ranges and long focal length, these lenses guarantee better intelligence, with effective target detection and tracking. Optics for Defense Applications.

Webinars

Accurate Laser Measurements: Why, When, and How
By Mark Slutzki, Product Manager, Ophir
On-Demand
The most fundamental method for checking the performance of your laser is to measure its power or energy output as this output directly affects the laser's ability to perform. Find out when and why absolute calibration accuracy matters (and when it doesn't), best practices for maximizing the accuracy of the readings you get, and how to understand your Power Meter's accuracy specs (and where those numbers come from). Laser Measurements.

Beam Attenuation: Principles of Laser Beam Profiling
Speaker: Dr. Derrick Peterman, Director of Sales, Ophir
On-Demand
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. Beam Profiling.

Research News

Widely Tunable, Narrow Bandwidth, mJ Level Tm:YAP Laser with YAG Etalons
A pulsed, narrow-band, tunable, end-pumped Tm:YAP laser suitable for biomedical, sensing, and material processing applications is demonstrated. The 35 nm wavelength continuous tunability ranges from 1926 to 1961 nm, having a spectral linewidth of 0.15 nm FWHM. Output power was measured using an Ophir L50(150)A-35 meter. Pulse energy was measured using an Ophir PE50-C pyroelectric energy meter. M^2 measurements and beam profiling were done with an Ophir Pyrocam IIIHR. Tm:YAP Laser.

Inductive Laser on Neon's Atomic Transitions Pumped by Pulsed Inductive Discharge
For the first time, lasing on electronic transitions of neutral neon atoms (540.1, 594.4, and 614.3 nm) pumped by a pulsed inductive cylindrical discharge was obtained. Energy characteristics were researched using an Ophir StarBright display with a PE10-C measuring head. The study of the spatial characteristics of the beam was made using an Ophir beam profiler. Inductive Lasing.

What's New

with." -*Rich Shea*

Social Media: Blog

New Power Sensor for CW Lasers & High Repetition Rate Pulsed Lasers
Introducing the new F80(120)A-CM-17 power meter, based on our latest CM absorber. Let's take a look at its benefits and advantages when measuring high repetition rate pulsed lasers and how the CM absorber works. F80(120)A-CM-17.

Laser Power Meter Accuracy: Contributing Factors
When using power sensors and meters to measure laser power, the million dollar question is: How accurate are the results? To help answer, let's examine everything that goes into an Ophir power sensor accuracy specification (as well as related specs, like linearity). Accuracy.

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

Formnext
November 16-19, 2021
Frankfurt, Germany

Optectnet Jahrestagung
November 24-25, 2021
Hannover, Germany

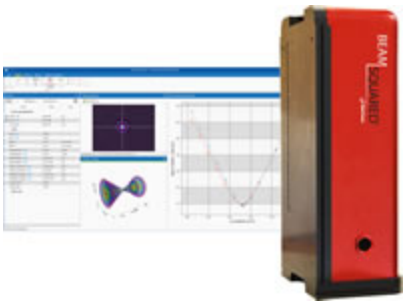
All-in-One Power Sensor for Production Applications

Meet the Ophir Helios Plus industrial laser power sensor for automotive and micro-machining applications. An expanded version of the Helios industrial laser power meter, the Helios Plus measures a wide range of high power lasers, including blue, green, and IR wavelengths. The sensor measures up to 12kW by short laser exposure, no water cooling needed. It includes three industrial communication protocols - PROFINET, Ethernet/IP, and EtherCAT - plus an RS232 interface, and is equipped with two power and two data ports for easy integration into existing line or ring topologies. Helios Plus.

Measure High Repetition Rate, Short Pulse Industrial Lasers to 120W

The Ophir F80(120)A-CM-17 is a state-of-the-art thermal sensor for measuring high repetition rate lasers with very short pulses in the nano, pico, and femto second ranges. High repetition rate lasers induce damage to conventional sensor coatings at lower power densities than required by users. The F80(120)A-CM-17 is a compact, calibrated, fan cooled sensor designed to solve that problem. It can withstand higher power densities and measure average power up to 80W and intermittent power up to 120W. Ideal for micromachining and material micro-processing applications in semiconductor, display, and medical industries. F80(120)A-CM-17 Sensor.

Lenses for Long Rayleigh Length Lasers



The Ophir BeamSquared M^2 laser beam propagation system automatically and accurately measures the propagation characteristics of CW and pulsed lasers with Rayleigh lengths up to 20 meters in less then one minute. The system comes equipped with conventional focusing lenses of 400-500mm and now adds sets of specially calibrated 750mm and 1000mm lenses for use with long Rayleigh range lasers (20m) that involve both a long-waist location and small focal spot size. The new lenses can be used with new and existing BeamSquared systems. BeamSquared.

New from the Ophir Team

We are pleased to announce the promotion of Dr. Derrick Peterman to Sales Director, Americas, for Ophir, an MKS Instruments company. He has worked with laser engineers and scientists on laser beam profiling applications for over 20 years. Check out his industrial welding video where he discusses how laser beam profiling with Ophir BeamGage showed why two different lasers running at the same power output produced different results. Derrick can be reached at derrick.peterman@mksinst.com.

FAQs

TechTalks Webinar
Laserschweißen/ Laserbasierende Prozesse in der Automatisierung und Produktion
November 25, 2021
Virtual

GNS 11 2021
December 2-3, 2021
Genoa, Italy

AKL: International Laser Technology Conference
May 4-6, 2022
Aachen, Germany

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Power Meters
I need to measure the power of a diverging beam whose divergence is very asymmetrical. The Fast axis divergence is ±80 degrees, while the Slow axis divergence is ±20 degrees. Will the IS6-D integrating sphere work? It's specified Maximum Beam Divergence is ±60 degrees. Read the FAQ.

When should I choose the "CM" type power sensor as opposed to the "PF" or "SV" type sensors? Read the FAQ.

Beam Profiling
What are the recommended measurement parameters for the WB-I and WB-I SWIR devices? Read the FAQ.

My laser power is too high, causing saturation of the sensor. What can I do to measure it? Read the FAQ.

Can the M2-200s system be used on Windows 10? Read the FAQ.

Where do I find a 3D drawing of my system? 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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