ePulse: Laser Measurement News

January 2020

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.

Photonics West

See What's New at Photonics West 2020

We continue to push the boundaries of laser and LED measurement, applying new technologies to create sophisticated yet easy-to-use systems to ensure laser performance and stability. See the latest in beam profiling, power/energy measurement, and IR optics at Booth 927 at Photonics West, February 4-6, 2020, including:

- IS1.5-VIS-FDP-800, high speed response, multi-function integrating sphere
- QBH-S-Fiber Adapter for high power sensors
- 16K-W-BB-55, high power laser sensor with fast response time and high damage threshold
- LBS-300HP-NIR, compact laser beam splitter for extremely high attenuation

Find out more, SPIE Photonics West 2020 Here We Come.

Keynote: Conversation with John Lee, MKS Instruments

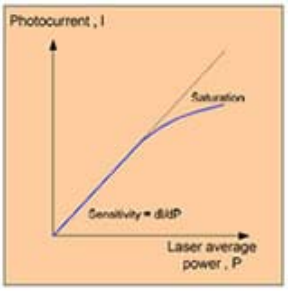
Dr. John Lee, President & CEO, MKS Instruments, will talk with *Laser Focus World* Editor in Chief John Lewis at the Lasers & Photonics Marketplace Seminar on Monday, Feb. 3, 2020. The conversation will explore Dr. Lee's views on the different applications that are now driving photonics markets, including industrial processing and life sciences, and will examine the competitive landscape for optics and laser manufacturers and opportunities for new technologies and products. Dr. John Lee.

Feature

Measuring Average Power of Pulsed Lasers with Photodiodes

By Efi Rotem and Mark Ivker, Ophir

When measuring average power using a photodiode detector, the photodiode can generate while still maintaining linearity. The saturation power is typically 3mW for a bare silicon photodiode. Adding attenuation in the form of a filter or through the use of an integrating sphere will naturally increase the saturation power of the sensor. Recent developments in VCSELs for applications in remote sensing require measurement of



Videos of the Month

VCSELs: How to Measure Their Power (Correctly)

Measuring VCSEL performance is absolutely critical in many applications, but it turns out to be quite tricky. Learn about the technical challenges you'll face when trying to measure VCSEL beams and about the Ophir solutions that will help you. Video: VCSELs.

High Attenuation Laser Beam Splitter

The LBS-300-HP-NIR beam splitter allows camera-based beam profiling for high power lasers. This patent-pending device features enabling technology that, for the first time ever, allows camera-based beam profiling for high power lasers. Video: High Attenuation Laser Beam Splitter.

Laser Puzzle

Try your hand at this month's Laser Puzzle. This month we've got Limburger cheese and the hungry mouse wants it. Your challenge is to figure out how far the mouse has to travel to get to the goods.

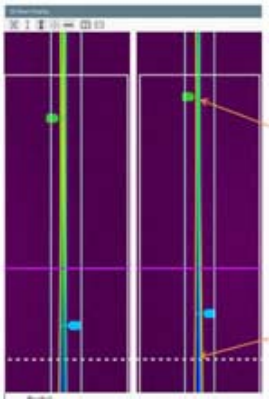
All submissions will receive an 8GB USB pen drive. The grand prize winner will receive a 16GB iPad. E-mail answers to sales@us.ophiropt.com. Need a hint? E-mail john@enigmaturge.com.

Here's the answer to last issue's puzzle. Congratulations to both winners - **Dave Filgas, Chief Laser Engineer, Aqwest LLC and Greg Waldherr, PhD, Principal Engineer, Hal Technology**.

average power during pulsed operation. When measuring average power of pulsed lasers, another mechanism may also affect the linearity of the photodiode. Pulsed Lasers.

Applications

Quality Assurance in Additive Production



The Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT has set a goal for itself to automate additive production and use this technology to manufacture the products of tomorrow in a resource-efficient manner. Whether in research or in production, the laser parameters must be checked regularly. Fraunhofer IAPT turns to Ophir BeamWatch AM to measure the laser beam without contact. It is compact enough to be used inside the production chamber and delivers measurement results very quickly. Fraunhofer IAPT.

IR Optics for Automotive Night Vision and ADAS

Poor visibility is a leading cause of traffic collisions worldwide, especially during night time hours and harsh weather conditions. Night vision systems are often used to provide increased vehicle and pedestrian safety. When it comes to developing optics for these systems, there must be high thermal imaging quality and long distance object detection to minimize collision risk and provide maximum performance. Automotive Night Vision.

Advanced IR Optics Assemblies for UAVs and Drones

The development of UAVs and drones with increasingly advanced infrared imaging systems presents challenges for UAV optics. Lens quality must increase in order to maximize imaging performance in line with detector capabilities, allowing for high resolution vision. The challenge is to design and produce optics with a crisp, clean image over the entire zoom range, and an MTF close to the diffraction limit, while meeting strict SWaP requirements. Optics for UAVs.

Choosing the Optimal FluxGage for Your Luminaire Application

The Ophir FluxGage is a compact measuring system for LED Luminaires. Instead of an integrating sphere that must be several times larger than the luminaire being measured, FluxGage can measure any LED fixture that fits into its opening. To select the FluxGage model that will best suit your needs, first consider two questions: What size are the luminaires that you plan to measure (what is their light emitting surface size), and what is their expected luminous flux? FluxGage.

You can also learn more about the different FluxGage systems at Light+Building in Frankfurt, March 8-13, 2020. See us in Hall 8, Stand J40.

Webinars

Do You Know If the Laser in Your AM System Is in Spec?

By John McCauley, Key Accounts Manager, Ophir
Date: February 26, 2020 at 1:00pm EDT/5:00pm GMT
Laser-based additive manufacturing brings many benefits to manufacturing, including reduced tooling costs, easier testing of complex geometries, and faster time to market. The challenge is that the performance of your laser will change over time. Understanding your laser's behavior is critical to successfully applying it to the AM process. In this webinar we will discuss laser system performance changes and how

"I've used a variety of Spiricon cameras and Ophir power and energy meters for Yb, Nd, Er, and Tm lasers with average powers up to 30kW and pulse energies up to 30J. The ability to log data easily using USB makes some lab work much simpler. On a recent project with a Thulium laser, I didn't have access to a camera that could see the beam near 2 microns and had to fall back on old-school methods to measure beam divergence. It was like a step back in time. I've since ordered a new Pyrocam camera and look forward to being able to "see" the 2-micron beam." - *Dave Filgas*.

"The Ophir beam profiler and power meter we use regularly are always reliable. The beam profiler especially has become indispensable for aligning and characterizing an advanced sensor system under development. Dan Ford's product expertise and friendship are similarly invaluable and greatly appreciated." - *Greg Waldherr*

Social Media: Blog

Laser Beam Optics: Calculating Focal Spot

Whether you're in the lab or a job shop, you need your laser beam to be a specific size to do the job. Getting to that size is not always simple. But there are a few equations we can use for spherical Gaussian beams. We have created a calculator that lets you determine the laser spot size and location for a beam that is focused by a lens. Laser Beam Optics.

Catalogs: Power Meters, Beam Profiling, IR Optics

Download the 2020 Ophir Laser Measurement Catalogs today. Includes tutorials and product specifications for power meters and beam profiling. Beam Profiling Magalog features application notes, technology articles, and reference algorithms.

The Ophir IR Optics Thermal Imaging Lenses Catalog 2020 covers IR components and complex lens assemblies with fixed or motorized focus and zoom lenses.

Trade Shows

DESY
January 30-31 2020
Hamburg, Germany

Photonics West
February 4-6, 2020

to understand them. Hosted by *The Additive Report*. Register here.

Research News

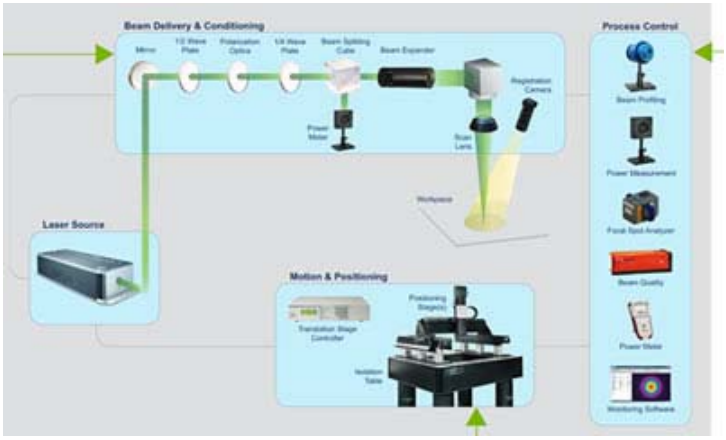
Full Noncontact Laser Ultrasound: First Human Data
Full noncontact laser ultrasound (LUS) imaging has several distinct advantages over current medical ultrasound (US) technologies: elimination of the coupling mediums (gel/water), operator-independent image quality, improved repeatability, and volumetric imaging. Experimental results demonstrating volumetric imaging and the first LUS images on humans are presented, all at eye- and skin-safe optical exposure levels. All laser component optical outputs were measured using an Ophir Nova II optical power meter. Noncontact Ultrasound.

THz Detection with Antenna-Coupled Highly-Doped Si Quantum Dot
Nanostructured dopant-based silicon (Si) transistors are promising candidates for high-performance photodetectors and quantum information devices. This research demonstrates THz detection with a lithographically defined and highly phosphorus-doped Si QD. A 40 nm-diameter QD is integrated with a micrometer-scale broadband logarithmic spiral antenna for the detection of THz photocurrent in a wide frequency range from 0.58 to 3.11 THz. The transmission factors were estimated using an Ophir Nova II optical power meter. THz Detection.

What's New

MWIR Long Range Lens Named 2020 PRISM Award Finalist
The Ophir® SupIR 50-1350mm MWIR f/5.5 long range, motorized continuous zoom lens has been chosen as a 2020 PRISM Awards finalist. The PRISM Awards are an annual international competition that honors the best new optics and photonics products on the market. This high-performance continuous zoom lens is designed to provide ultra-long-range capabilities for advanced thermal imaging cameras in security and surveillance applications. PRISM Award.

Surround the Workpiece
Surround the Workpiece® is an MKS Instruments offering that includes product design and development, system level integration, research and development, system, subsystem and component selection, and maintenance, repair and calibration services in the field of lasers and photonics for manufacturing, metrology, medical, research, surveillance and defense applications. Surround the Workpiece.



FAQs

Beam Profiling
How do I get the maximum frame rate out of my camera? Read the FAQ.

San Francisco, CA

EALA - European Automotive Laser Applications
February 11-12, 2020
Bad Neuheim, Germany

ATX West
February 11-13, 2020
Anaheim, CA

Automation & Testing
February 12-14, 2020
Turin, Italy

FMA Annual Meeting
March 5, 2020
San Antonio, TX

Light & Building 2020
March 8-13, 2020
Frankfurt, Germany

DPG-Fruhjahrstagung (SAMOP) 2020
March 10-12, 2020
Hannover, Germany

LEF 2020
March 10-11, 2020
Nurnberg, Germany

OFC
March 10-12, 2020
San Diego, CA

AMUG
March 22-26, 2020
Chicago, IL

Microlas Innovations Forum
March 24-25, 2020
Rostock, Germany

RAPID + TCT
April 20-23, 2020
Anaheim, CA

SPIE Defense + Commercial Sensing
April 26-30. 2020
Anaheim, CA

Fast Ship Program

Ophir's Fast Ship program provides one-day shipment of the most popular power/energy, beam profiling, and M2 laser measurement equipment across the U.S.

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www.ophiropt.com/photonics

How can I control my new BeamSquared system from my own software program? Read the FAQ.

Power Meters
When disconnecting my meter from my PC (I was using StarLab software), the meter's keypad stays locked until I restart it. Why? Read the FAQ.

Why do some thermal sensors have a small "tube" on the front? 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 and zoom 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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