

# ePulse: Laser Measurement News

The true measurement of laser performance



## ePulse: Laser Measurement News December 2022

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

#### Integrated Power Measurements in Automated Laser Systems

By Nicolas Meunier, Business Development Manager

Due to their durability and efficiency, lasers in the kW range offer myriad possibilities, especially in material processing. Experience shows that regular measurement of high power laser parameters has a protective effect on the entire process. Deficits can usually be quickly corrected once they're discovered. The best assurance of processing quality is provided by robust measuring devices that can be integrated directly into the laser processing cell. Here's how.

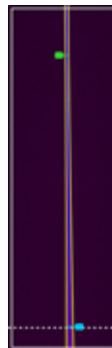
[Automated Laser Systems](#).



#### Manufacturing Trends Drive Advancements in Laser Beam Measurement Technology

By John McCauley, Sr. Business Development Manager

Lasers are used in a wide variety of environments in an increasing number of applications, from mapping objects in front of a vehicle at thousands of times per second to pointing multiple kilowatts of light at a flying object in order to disable it. To ensure these systems are operating to spec, we need to measure the laser's performance. Let's look at some of the trends driving measurement technology advances, from the need for faster cycle times to Industry 4.0 to Additive Manufacturing. [Manufacturing Trends](#).



#### Optimizing Optics Design to Minimize Maintenance

By Yoram Mor, Director of Sales Operations, Ophir Products

While many fab shops and manufacturers have made the move to fiber lasers, many others still rely on CO<sub>2</sub> lasers or are just now making the shift. For those who are new to fiber lasers, it's important to understand the maintenance requirements of critical optical components. From *Shop Floor Lasers* magazine, [Optimizing Optics Design](#).



### Applications

## Videos of the Month

### Laser Measurement PC Interfaces

If all your laser measurement work involves a laptop or a PC, rather than a stand-alone meter, one of Ophir's direct-to-PC interfaces could be an ideal solution. These are full-fledged Laser Power and Energy meters, but instead of having a separate on-board display, the PC becomes your display. [PC Interfaces](#).



### Ariel, Ultra-Compact "All in One" Sensor for Measuring Industrial Lasers to 8kW

Designed for OEM and end-user applications in closed and confined spaces, such as additive manufacturing, metal cutting, and welding, 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. [Ariel Sensor](#).



### Fundamentals of Beam Profiling

Learn how to measure your laser beam, find out which different shapes of "beam profile" or spatial energy distribution are required for different laser applications, such as welding and cutting and check out the impact that laser beam diameter has on laser power density. [Beam Profiling](#).

## Luminous Quality for Optimal Photobiomodulation

Numerous studies show that positive effects on well-being can be achieved with light in the red and infrared wavelengths. With this in mind, Lichtblock GmbH developed a compact light system that radiates red light in wavelengths of 630, 660, and 850 nm. In order to test the quality of the systems and document their effectiveness with correct and comparable values, the company uses an Ophir® power gauge. [Photobiomodulation](#).

## Audio Blog: How to Make Laser Welding and Cutting Affordable and Sustainable

As production supply chains become more complex, turnaround times for vendor parts become increasingly shorter for manufacturers. And nobody with a just-in-time production line can afford quality problems with individual components. Automated measurement of important parameters in the production context improve quality and ensure transparent processes; this also applies to laser welding and cutting. Listen now: [Laser Welding and Cutting](#).



## What's New

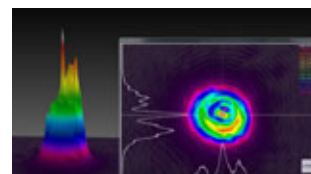
### See What's New at Photonics West 2023

Stop by the MKS booth at Photonics West 2023 to see what's new in laser beam profiling, power/energy measurement, and IR optics, Jan 31-Feb 2, 2023. Featured products include:

- [Ariel](#), ultra-compact laser power meter for measuring high power industrial lasers up to 8kW, such as in additive manufacturing.
- [BeamPeek®](#), integrated beam analysis and power measurement system for fast, accurate, real-time measurement of lasers in additive manufacturing chambers.
- [IPM-10KW](#), high power modular laser power sensor that delivers high accuracy and repeatable measurements in rough production environments.
- [SP504S](#), beam profiling camera for measuring large and divergent beams from 340-1100nm for beam sizes from 45µm up to 23mm x 23mm.
- [LightIR 18-225 f/4](#) low-SWaP continuous zoom lens with long EFL, +16km detection range for MWIR 10µm SXGA and 15µm VGA detectors in aerial applications.
- [SupIR 80-1200mm f/5.5](#) and [SupIR 60-1200mm f/4](#) providing long-range observation ranges exceeding 28+km, rugged, ideal for security and surveillance systems, designed for 10µm SXGA/HD and 15µm VGA sensors.

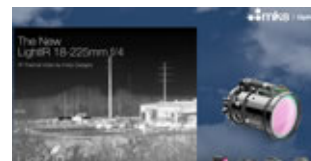
## Ophir® Low-SWaP, Long-Range MWIR Lens for Drone and Small Gimbal Applications

The Ophir® LightIR 18-225mm MWIR f/4 continuous zoom lens features a compact design with reduced optical elements that significantly decreases the length and weight of the lens and, therefore, the overall size and weight of the optical system in which it is incorporated. The lens weighs only 326g, making it 20% smaller than similar lenses. This makes it ideal for demanding SWaP requirements and small gimbal thermal imaging applications, such as drones and tactical UAV IR cameras, as well as



## Low-SWaP IR Zoom Lenses for Cooled MWIR and Uncooled LWIR Cameras

Designed specifically for use in unmanned aerial vehicles, payloads, drones and hand-held devices. The LightIR family now includes the NEW LightIR 18-225 f/4 with its disruptive combination of SWaP capabilities, long detection range exceeding 16km, rugged design, and cost-effective pricing. [Low-SWaP IR Zoom Lenses](#).



## Social Media: Blog

### Medical Lasers: When Utmost Safety is Required

The use of lasers directly on humans requires the utmost care. This demands rigorous review of the relevant parameters and the development of laser measurement technology, such as new coatings and filters for the sensors and constant updating and enhancement of system software. [Medical Lasers](#).

### Volkswagen AG Significantly Increases Laser Welding Speeds

The laser seam welding of sheets of zinc-coated steel – a combination of metals with disparate melting and evaporation properties – used to be a major challenge for the automotive industry. Volkswagen AG is pursuing a newly developed process that enables significantly higher welding speeds. [Laser Welding](#).

### High Power Lasers: From Sci-Fi to Reality

Since their invention in 1960, lasers have become a fixture in science fiction, impressing the audience with their futuristic capabilities – namely, extreme precision and power. [High Power Lasers](#).

## New Catalogs: Power Meters, Beam Profiling, IR Optics

The [2022 Ophir Laser Measurement Catalogs](#) include

micro/mini-tactical payloads in the commercial, homeland security, and defense markets. The innovative design enables near diffraction-limit performance in harsh environments. [Ophir LightIR 18-225mm MWIR f/4 Lens](#).

## Webinars

### Laser Measurement Accuracy: Why, When, and How

*Speaker: Mark Slutzki, Product Manager*

*January 11, 2023, 4:45pm EST*

Accurately measuring a laser's output is fundamental to ensuring it performs reliably and correctly - from when the laser is first manufactured, through its integration into a system, and on to its final application. At the Photonics Spectra Conference 2023, Mark will discuss when and why absolute calibration accuracy matters (and when it doesn't), best practices for maximizing the accuracy of readings, and an overview on how to understand a power meter's accuracy specifications and where those numbers come from. [Laser Measurement Accuracy](#).

### Managing Laser Degradation in Industrial Applications

*Speaker: John McCauley, Senior Business Development Manager*

*On-Demand Webinar*

The natural degradation of laser materials can cause variability in performance. Aging optics can slow changes in laser behavior and can lead to loss of process efficiency. An unclean process environment can quickly change a laser's behavior through thermal lensing. This webinar discusses how these variabilities are managed, what aspects of a laser's performance should be analyzed, and what tools are available to perform the analyses. [Managing Laser Degradation](#).

### High Power Laser Measurement: Challenges and Solutions

*Speaker: Mark Slutzki, Product Manager*

*On-Demand Webinar*

Monitoring laser behavior in high-power applications is critical to keeping your process running properly. However, that monitoring is not trivial. There are many "little things" one could do that might unknowingly mess with the measurement, or even damage the instrument. You could actually damage your expensive laser power sensor. In this webinar, you'll learn what some of these potential challenges are and how to deal with them correctly. [High Power Laser Measurement](#).

## Research News

### Fabrication of Large-Area Metasurfaces

Rigorously designed sub-micrometer structure arrays are widely used in metasurfaces for light modulation. A patterned pulse laser lithography (PPLL) approach was developed to create structure arrays with sub-wavelength feature resolution and periods from less than 1  $\mu\text{m}$  to over 15  $\mu\text{m}$  on large-area thin films with substrates under ambient conditions. Pictures of the laser profiles were taken with an Ophir LT665 beam profiling camera running BeamGage software. [Large-Area Metasurfaces](#).

### Effects of Inhibitory Interneurons in Mouse Barrel Cortex

Inhibitory interneurons play central roles in the modulation of spontaneous network activity and in processing neuronal information. Parvalbumin-positive (PV+) interneurons were studied in the barrel cortex of adult mice. The light for excitation was delivered by a 60 mW solid state laser at 552nm. To ensure reproducibility of the power density used, the output power at the end of the fiber was measured prior to each experiment with an Ophir Nova 2 laser power meter. [Inhibitory Interneurons](#).

## FAQs

### Power Meters

Sometimes when we log power measurement data, we find "gaps" in the

tutorials and product specifications for laser power meters and beam profiling systems.

The [2022 Ophir IR Optics Thermal Imaging Lenses Catalog](#) includes a wide range of LWIR and MWIR 1-FOV, Multiple FOV, and continuous 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.

[Focus on Photonics Newsletter](#) for innovations in lasers, opto-mechanical components, vibration and motion control, and laser characterization.

## Trade Shows

[Photonics West 2023](#)  
January 28-February 2, 2023  
San Francisco, CA

[IDEX | International Defence Exhibition & Conference](#)  
February 20-24, 2023  
Abu Dhabi, UAE

## Follow Us Online

### Social Media



### Blog

[The Ophir Laser Measurement Group](#)

### Web

[www.ophiropt.com/photonics](http://www.ophiropt.com/photonics)

data - a time interval (significant fraction of a second) during which the timestamps show that there is no data. Why does that happen? [Read the FAQ](#).

When measuring single shot pulse energy, how long must I wait after a pulse before firing the next pulse? I'm setting up an automated system, so waiting to see "Ready" displayed is not an option. [Read the FAQ](#).

Do you have software commands for functions like "Offset" and similar, via communication to a PC? I didn't see any such command in the documentation. I know the meters themselves have such functions. [Read the FAQ](#).

### **Beam Profiling**

Can I operate my NanoScan 2s Ge/3.5/1.8 or Ge/9/5 system with a visible laser below 700 nm? [Read the FAQ](#).

Is the M2-200s still being serviced and recalibrated? [Read the FAQ](#).

## **About Ophir**

Ophir is a brand within the MKS Instruments Photonics Solutions 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, OEM and replacement high-quality optics and sub-assemblies for CO<sub>2</sub> and high-power fiber laser material processing applications. Ophir products enhance our customers' capabilities and productivity in the semiconductor, advanced electronics, and specialty industrial markets. For more information, visit [www.ophiropt.com](http://www.ophiropt.com).

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