

# ePulse: Laser Measurement News

The true measurement of laser performance



## ePulse: Laser Measurement News October 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

#### Continuous Process Improvement: Checking Laser Output Power

By John McCauley, Senior Business Development Manager

Variable laser performance is often a source of problems for the laser operator. To address this issue, laser measurement equipment is employed. But traditional laser power meters and beam profilers have been quite delicate and unable to withstand harsh production environments. They have also been cumbersome to integrate into a laser cell. New technology has been introduced that addresses these challenges. In this article from *Shop Floor Lasers*, we discuss the issues and introduce the Ophir IPM 10-KW industrial power meter. [Industrial Laser Measurement](#).

#### High Power Lasers: Just Measure Them

By Yoni Groisman, Application Engineer

High power laser applications are demanding. The laser's focal spot and beam profile need to be kept within specs to achieve the required part quality and establish a reproducible process. How can laser parameters of beams in the range of multi-kilowatts, with power densities reaching more than 10 MW/cm<sup>2</sup> be measured without damaging the camera or the optics? Laser Zentrum Hannover put the new Ophir LBS-300HP-NIR beam splitter to the test. [High Power Lasers](#).



### Applications

#### Laser Safety in Stage Marking

What would live concerts, festivals, and TV shows be without breathtaking laser shows and stunning special effects? One area that has become increasingly important is stage marking using laser projections. Safety is highest priority for the laserfabrik team. Their proprietary series of measurements, taken with Ophir sensors, yielded instructive insights on laser power when used in stage marking. [Laser Stage Marking](#).



#### Medical Lasers: When Safety is Paramount, Critical Parameters

### Videos of the Month

#### High Power Laser Measurement for Tough Industrial Environments

Meet the new Ophir IPM-10KW, a modular industrial sensor for measuring the average power of high-power lasers up to 11kW. It has a rugged industrial design and integrates into modern automation systems using standard industrial communication protocols. [Ophir IPM-10KW](#).



#### Automated Beam Measurement for Industrial High Power Lasers

The Ophir BeamWatch Integrated industrial laser beam profiler is designed for materials processing. For use with high-power laser beams, the measurement device combines non-contact beam profiling of the BeamWatch family and an Ophir power measurement sensor with high industrial standards in automation technology. See the system in action. [Ophir BeamWatch Integrated](#).



#### High Damage Threshold Laser Power Sensor

If you need to measure the power of high repetition rate lasers with very short pulses (typical in many micromachining applications), with powers up to 200W - and you want a sensor that will survive the experience - the new Ophir F150(200)A-CM-16 may be exactly what you need. [Ophir F150\(200\)A-CM-16 Power Sensor](#).

## Must Be Measured

By Jürgen Reingruber, Director Sales - Ophir Spiricon Europe

The use of lasers directly on humans requires the utmost care. This requires rigorous review of relevant parameters, including power or energy of the laser beam and beam profile. The development of measurement technology for lasers plays just as important a role as the innovations in the lasers themselves. Here's a look at the key parameters, how to measure them, and how to choose the appropriate measurement device. [Medical Laser Safety](#).

## Audio Blog: BeamWatch System Optimizes Laser Process Development

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. But Volkswagen AG is pursuing a promising approach with multi-focal laser welding, a newly developed process that enables significantly higher welding speeds than possible with conventional mono-focal laser beam welding systems. [Laser Seam Welding](#).



## What's New

### Ophir BeamPeek Beam Profiler Wins Innovator Award

We are honored that the Ophir BeamPeek Beam Profiler has been awarded a 2022 *Laser Focus World* Innovator Award, Silver. Our integrated beam analysis and power measurement system provides fast, accurate, real-time measurement of lasers in additive manufacturing chambers. The system provides simultaneous beam profiling, focal spot analysis, and power measurement in just three (3) seconds. There is no need for water or fan cooling as the system includes a replaceable passive cooling beam dump tray that eliminates downtime between measurement sessions. [Ophir BeamPeek](#).



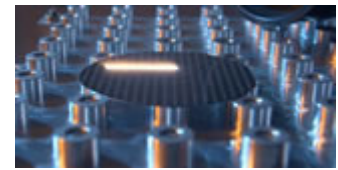
### Large Beam Profiler for High Resolution Measurement of Large and Divergent Beams

The Ophir SP504S beam profiling camera is designed to measure large and divergent beams. It accurately captures and analyzes wavelengths from 340-1100nm for beam sizes from 45µm up to 23mm x 23mm. The camera features a wide dynamic range of 44.6dB, a lowest measurable signal of 0.25nW/cm<sup>2</sup>, and high accuracy at NIR wavelengths. The SP504S camera provides the industry's smallest pixel size of 4.5 µm - up to 3X smaller than competitive offerings - which allows measurement of laser beams with higher spatial resolution and smaller beam sizes. [Ophir SP5045S Camera](#).



### Juno-RS Virtual Meter (PC Interface)

The Ophir Juno-RS virtual meter provides easy integration of Ophir's smart power and energy sensors into automation systems (e.g. PLCs) using RS-232 communications. This turns your PC or laptop into a full-fledged Ophir laser power/energy meter with advanced logging and data processing capabilities. [Ophir Juno-RS PC Interface](#).



### Measuring LED Irradiance and Dosage

Does your application involve irradiating a target surface with an LED? UV curing of adhesives is one example of such an application. Ophir's PD300RM sensor family measures irradiance and dosage for UV and Visible LEDs. [Ophir PD300RM](#).



## Social Media: Blog

### Why and How to Profile Challenging Laser Applications

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

### Calibrating Sensors: Have You Forgotten Anything?

Sensors used for measuring laser power or energy should be calibrated regularly. Frequently, customers sending a sensor to our calibration laboratory for the first time will neglect to include the accessories that go with it. The consequence is that the calibration cannot be carried out, causing delays. But which sensors have specific accessories - and what does that mean, exactly? [Calibration](#).

### Measurement Challenges in Additive Manufacturing

Process experts are often presented with major challenges when checking laser beams in AM chambers. New developments in the field of measurement technology now enable the rapid measurement, directly in the construction chamber, of the kind of high-power laser beams used in selective laser melting/laser powder bed fusion. [Additive Manufacturing](#).

## Wide Beam Imager Now Works with High Resolution SP932U Camera

Many applications involve widely diverging or large beams such as VCSELs, laser diodes, LEDs, and fiber lasers. To guarantee best performance in all these applications, the characterization of the beam profile is highly important. However, the apertures of conventional beam profilers are too small to capture the entire beam. This issue is solved by Ophir's WB-I VIS (Wide Beam Imager) for 350-1100nm wavelengths which now operates with the new, higher resolution Ophir SP932U camera. [Wide Beam Imager](#).



## Webinars

### Body-in-White Laser Joining: Critical Laser Measurement Scenarios

*Speaker: John McCauley, Senior Business Development Manager  
October 12, 2022, 1:00pm ET / 5:00pm GMT*

Laser joining processes have developed into very robust processes. Yet laser behavior still changes over time, mostly due to operation in harsh production environments. This webinar will discuss which laser parameters are typically measured during laser joining processes, why they're important to the consistency of the process, and what could happen if the laser isn't analyzed in these applications. [Body-in-White Laser Joining](#).

### Managing Laser Degradation in Industrial Applications

*Speaker: John McCauley, Senior Business Development Manager  
November 2, 2022, 1:00pm ET / 5:00pm GMT*

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](#).

### Meet Ariel, Laser Power Measurement for Space Constrained, Humid, Dusty Places

*On-Demand Webinar*

Learn what our all-in-one high laser power sensor can do for you, and get an overview of how to interface with it and use it. If you need to measure industrial high-power laser beams in tight or inaccessible spaces (Additive Manufacturing chambers might be a good example), you will want to learn more about Ophir Ariel. [Industrial Power Measurement](#).

### Measuring My Laser: Where Do I Start?

*On-Demand Webinar*

Learn the basic principles and best practices of laser measurement. Do you have a laser you're about to start working with? You have enough experience with other technologies to know that you want to verify its performance, so you start looking for a tool to measure the laser's...well, what? In other words: Where do I start? What exactly do I need to measure, when, and how? (Not to mention, Why?) [Measuring My Laser](#).

## Research News

### Space Object Identification via Polarimetric Satellite Laser Ranging

The rapid identification and precise orbit determination of space objects is

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

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

[FABTECH Expo](#)  
November 8-10, 2022  
Atlanta, GA, USA

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

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### Blog

[The Ophir Laser Measurement Group](#)

### Web

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

mandatory for space management. Here researchers design, build, and test polarized light-switching retroreflector assemblies and investigate the feasibility of accurate signal measurement from satellite laser ranging (SLR) ground stations. Behind the polarization state analyzer, the power of the reflected light is measured with an Ophir PD300-SH power sensor to obtain an integrated intensity. [Satellite Laser Ranging](#).

### **Large Area Fabrication of LIPSS Using Multi-Parallel Femtosecond Laser Processing**

In this research, laser induced periodic surface structures (LIPSS) are investigated as possible means of producing a surface with the needed wettability. The wetting property control of a stainless-steel surface, structured using parallel processing via an array of 64-femtosecond laser beams, is analyzed. Laser power is measured with an Ophir F150(200)A-CM-16 sensor. [LIPSS Laser Processing](#).

## **FAQs**

### **Beam Profiling**

Can I connect and use more than one NanoScan V2s to my computer? [Read the FAQ](#).

Is Windows 11 supported by Ophir measurement software? [Read the FAQ](#).

### **Power Meters**

The damage thresholds for your Integrating Sphere sensors are only given for the sphere surface. What about for the detector? [Read the FAQ](#).

I have several PD300-UV sensors that I use regularly. While most remain in perfect agreement event after extensive use, one has been reading lower by several percent, with this effect increasing over time. What might be the problem? [Read the FAQ](#).

My brand new StarLite is not recognized by the StarLab software. What's the problem? [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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