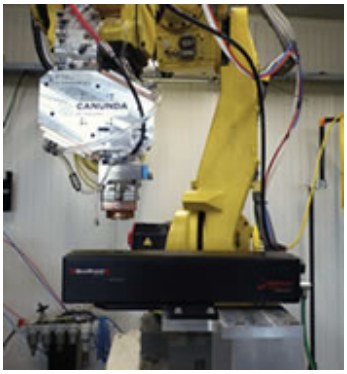
ePulse: Laser Measurement News

January 2025

Welcome to **ePulse: Laser Measurement News**, a review of new developments in laser beam measurement, 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

Shaping High-Power Laser Beams for Superior Welding



A key issue with high-power lasers in welding applications is the focal shift. Cailabs, inventor of leading-edge photonics like MPLC (multiplane light conversion), has now developed innovative beam shaping modules that minimize focal shift and maximize the quality of the weld seam. To analyze the laser beam and demonstrate the technology's superior results, the team relies on the Ophir BeamWatch, a unique non-contact beam profiling system. High Power Lasers in Welding.

In-Process vs At-Process Monitoring in Industrial Laser Processing

By John McCauley, Sr. Business Development Manager, Ophir

Too little data about how the laser is performing does not help laser operators fully understand how to manage changes within the laser system. Too much data about how the laser is performing is overwhelming, confusing, and ultimately counterproductive. In this *Laser Focus World* article, we take a look at the different approaches to measuring a laser's performance characteristics, process material considerations, and a comparison of in-process vs at-process approaches. Industrial Laser Processing.

See What's New at Photonics West 2025

Stop by MKS booth #927 at Photonics West 2025 to see what's new in laser beam profiling, power/energy measurement, and IR optics, Jan 28-30th.

Video of the Month

New: 3A-IS Integrating Sphere Sensor

Measuring a widely diverging, low power beam (think of laser diodes, fibers, etc.) can be challenging. The 3A-IS family of Integrating Sphere Sensors can help you fully capture and accurately measure such beams. Integrating Sphere Sensor.

Blog Posts

Unraveling the Intricacies of Laser Microprocessing

From marking and engraving to cutting cover glass for smartphones, join us on a journey through the intricacies of laser technology and its transformative impact on modern manufacturing. Laser Microprocessing.

Surface Micro Structuring Using Ultrashort Laser Pulses

The Center for Physical Sciences and Technology in Vilnius Lithuania shows a novel system for large area surface micro structuring using femtosecond laser. The researchers used Ophir's F150(200)A-CM-16 sensor specially designed for USP lasers, to measure the power of the laser before the DOE and monitor the energy dose delivered to the surface. Ultrashort Laser Pulses.

Laser Applications in EV Car Batteries

There are several processes in the manufacturing of the battery pack in which lasers can be used to improved reliability and throughput. Let's look at several

Featured new products:

- **Helios Pro Industrial Laser Power Sensors,** measure high power industrial lasers up to 12 kW.

- **819-SL-06-WL Optical Power and Wavelength Measurement Sensor**, integrating sphere-based silicon sensor for simultaneous power and wavelength measurements, 400-1100 nm, up to 1 W, for free-space and fiber-coupled applications.
- **BeamSquared® SP204S-Pro M^2 Analyzer**, fully automatic M^2 propagation analyzer for 266-1100 nm, CW or pulsed lasers.
- **BeamSquared® 1203 M^2 Analyzer**, compact, fully automated M^2 analyzer for 900-1700 nm lasers; measures CW and pulsed laser propagation with spots down to 150 µm.
- **70K-W High Power Meter**, water-cooled thermal power/energy laser sensor for ultra-high powers in demanding industrial and defense applications; 130 mm aperture.
- **150K-W High Power Meter**, water-cooled thermal power/energy laser sensor for ultra-high powers in demanding industrial and defense applications; 200 mm aperture.
- **20K-W-BB-55 High Power Sensor**, water-cooled thermal power/energy laser sensor for very high powers in demanding industrial and defense applications; 55 mm aperture.

Recently released:

- **SP204S CMOS Beam Profiler**, high-resolution camera with large 1 1/8" sensor; accurately characterizes laser beams, both collimated and tightly focused beams, from 27 µm up to 5.6 mm.
- **SP402S Large Format Beam Profiler**, high-resolution camera with large 1.1" sensor; accurately characterizes laser beams, from small focus spots of 27 µm to large widths up to 12 mm.
- **NIR & SWIR Zoom Lenses**, for next generation imaging, these unique solutions redefine long-range imaging with their unparalleled low-SWaP (Size, Weight, and Power) design.
- **Low-SWaP Folded-Optics Lenses**, for unmanned systems, these lenses deliver a unique blend of compact design exceptional optical performance, and advanced long-range imaging capabilities.
- **CO_2 Laser Optics**, for high power industrial applications, these ZnSe lenses, Copper and Silicon mirrors, and custom scan lenses specifically designed for 9.4µm PCB via drilling.
- **1-Micron Fiber Laser Optics**, lenses, doublets, aspherical lenses, protective windows, and sub-assemblies that deliver unmatched optical clarity and robustness.

Applications

Laser Focal Spot Size Calculator
Focal spot size establishes the examples, EV Car Batteries.

Preventing Sensor Deterioration
Sometimes, you can use your thermal sensors for years without the need for repairs. But when we receive these sensors for calibration, we can often tell that misuse led to the sensor's deterioration. Here are 3 things that can help prevent deterioration of your thermal sensors. Sensor Deterioration.

The Power of Lasers in Medical Applications: Precision, Control, and Innovation
Let's explore the unique capabilities of lasers, their diverse medical uses, and the importance of accurate measurement in ensuring safety and effectiveness. Lasers in Medicine.

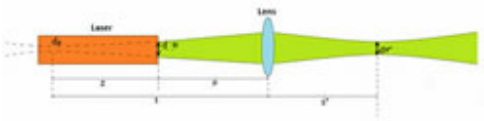
AutoX vs. UltraCal: Which Tool Should You Use for Laser Beam Analysis?
Ophir's BeamGage software offers two handy features: AutoX and UltraCal. AutoX is perfect for fast adjustments, automatically tweaking camera settings to get the best exposure for your laser measurements. It's great for environments where things are always changing. On the other hand, UltraCal focuses on precision. It corrects errors and sets a stable baseline, making it ideal for tasks where you need reliable, repeatable results. Find out how to choose. AutoX vs UltraCal.

Unveiling the Power of Photodiode Sensors
When a laser photon source is directed at a photodiode detector, a current is created. The power meter unit amplifies this signal and indicates the power level received by the sensor. Thanks to Ophir's power meter circuitry, the noise level is very low. And thanks to our exclusive patented dual detectors, the sensor automatically subtracts background light. Photodiode Sensors.

Catalogs: Power Meters, Beam Profiling, IR Optics

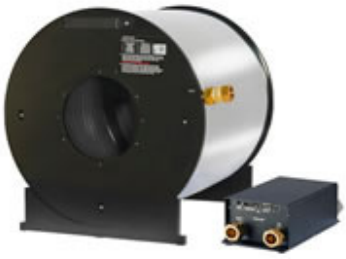
New: The 2025 Ophir Laser Measurement Catalogs include tutorials and product

maximum energy density that can be achieved when the laser beam power is set. This is an important consideration in material processing where smaller is better. Use this calculator to get the size and location of your Gaussian laser beam waist at focus, as well as the Rayleigh range. Calculating Laser Focal Spot Size.



What's New

150K-W High Accuracy, High-Power Laser Sensor for Defense and Industrial Applications



The Ophir® 150K-W Very High Power Laser Sensor measures very high power levels up to 150 kW with exceptional accuracy and dependable performance. This water-cooled, calorimetric sensor measures powers from 10 kW to 150 kW over the spectral range of 900-1100 nm. Extremely low back reflection of <0.5% ensures operational safety. Incorporating a beam dump and measurement unit, the sensor is designed to address the growing need for higher power in high-power fiber laser development and testing, directed energy systems, and cutting and drilling in industrial production. 150K-W High Power Laser Sensor.

2025 Catalogs Now Available

Ophir offers a complete range of beam profiling and power/energy measurement solutions, including customized OEM instrumentation that can be built into host systems, such as medical, industrial, defense, and more. Download the new 2025 catalogs: Laser Power & Energy Measurement and Laser Beam Analysis, Power/Energy Meters, Power Sensors, Power/Energy Sensor, Energy Sensors, OEM Sensors, and Software Solutions. 2025 Catalogs.

Webinars

Pyroelectric Detectors: Insight to Energy

On-Demand

Speaker: Kevin Kirkham, Sr. Principal Sales Engineer, MKS Ophir

Pyroelectric detectors are critical in advancing various technologies by providing quantitative insights into the energy within a system. They exploit the pyroelectric effect, where a material generates an electric charge in response to a change in temperature. This makes them highly sensitive to variations in infrared (IR) radiation and thermal energy. They are instrumental in enhancing the efficiency of solar cells, harvesting energy from low-temperature sources, and sensing IR light. Pyroelectric Detectors.

Understanding Laser Measurement Accuracy

On-Demand

You already know how important it is to monitor what your laser is doing - so you regularly measure it. You even check the power meter's datasheet to see how accurate those measurements are...and at that point many people get stuck. We get lots of questions from customers trying to understand our accuracy specifications and the meaning of the various parts of our C.O.C. (Certificate of Calibration). Laser Measurement Accuracy.

Measurement Solutions for Medical Applications: How to Get It Right

specifications for laser power meters and beam profiling systems.

New: The 2025 Ophir IR Optics Thermal Imaging Lenses Catalog includes a wide range of LWIR, MWIR, and SWIR continuous zoom lenses compatible with 5µm, 10µm SXGA & 15µm VGA detectors, as well as 1-FOV and multiple FOV. Includes new product specs, extended range of lens DRIs, and detailed H-FOVs charts per detector.

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.

Ophir IR Optics Newsletter for the latest developments in thermal imaging optics.

Trade Shows

SPIE Photonics West
25-30 January 2025
San Francisco, CA USA

SPIE BiOS Expo
25-26 January 2025
San Francisco, CA USA

IDEX
17-21 February 2025
Abu Dhabi, UAE

LASER World of PHOTONICS China
11-3 March 2025
Shanghai, China

SPIE Defense & Commercial Sensing
13-17 April 2025
Orlando, FL, USA

AUVSI Xponential
19-22 May 2025
Houston, TX USA

DSEI Japan
21-23 May 2025
Chiba, Japan

LASER World of PHOTONICS Munich
24-27 June 2025
Munich, Germany

On-Demand
Speaker: Mark Slutzki, Product Manager, MKS Ophir
Medical applications have unique requirements, both technical and regulatory. A laser that is behaving even a little bit differently than expected can affect the medical process that is based on it; the potential impact of this could be major - and difficult to track down. In this webinar, we will look at the unique measurement challenges facing medical laser applications, and a range of solution approaches. Medical Applications.

Research News

GAFchromic EBT Film Lateral Resolution and Contrast in the UV-Blue Range
The sensitivity of radiochromic films to UV-blue light is increasingly considered for light dosimetry purposes, owing to their bidimensional detection capabilities and ease of use. Yet spatial resolution studies remain scarce, especially for small field-of-view applications. This research examines the spatial lateral resolution and contrast reproduction of GAFchromic EBT2 and EBT3 models. Laser power was measured by an Ophir Nova power meter. Radiochromic Films.

Supercontinuum Generation in Scintillator Crystals
This research is a comparative experimental study of supercontinuum generation in undoped scintillator crystals. Results revealed that gadolinium gallium garnet (GGG) and bismuth germanate (BGO) offer durable, optical damage-free performance at a laser repetition rate of 200 kHz, suggesting that these materials are good alternatives to YAG and KGW for low threshold, high average power supercontinuum generation in the near- and short-wave infrared spectral ranges. Thermal energy was measured with an Ophir 3A-PF-12 meter. Supercontinuum Generation.

LASER Korea 2025
2-4 July 2025
Gyeonggi-do, South Korea

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www.ophiropt.com/photonics

About Ophir Products

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_2 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.

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