ePulse: Laser Measurement News

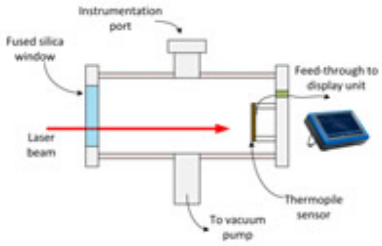
June 2025

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

Laser Power and Energy Measurement in High Vacuum

By Efi Rotem, Senior Director R&D, Ophir



Laser power and energy measurements in high vacuum are needed in areas such as semiconductor fabrication, high energy physics, and space missions. Designing for high vacuum requires knowledge and understanding of the materials and their properties in vacuum, and the necessary equipment for testing the sensor in vacuum and under laser radiation in order to evaluate the outgas rate during pump down and during laser operation. Several challenges need to be addressed, including outgassing, heat dissipation, signal transmission and calibration. High Vacuum.

How Often Should Output Power on High-Powered Production Lasers Be Checked?

By John McCauley, Sr. Business Development Manager, Ophir

The question of how often laser power should be checked comes up frequently. Truth is, there are no set rules. Process specifications will call for the laser to be checked anywhere from several times a day to once a quarter, depending on the manufacturer's needs. That said, there are several times throughout a laser's life when it should be measured. Laser power is most often verified: (a) during the development of a new laser source, (b) when its application is developed, and (c) when it is integrated into a new system. Your investment in the laser process should be most protected at this time. Checking Laser Power.

Video of the Month

Beam Pointing Stability Measurement Made Easy
Do you need to align a complex optomechanical system? As you make various adjustments, Ophir's BeamTrack sensors help you keep track of the beam's power as well as its pointing stability, all at the same time. Beam Pointing.

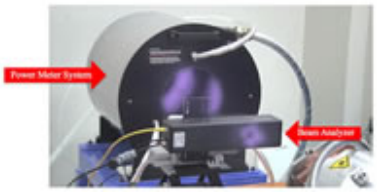
Ariel Industrial Meter, Now Even Better
The Ophir Ariel, a palm-sized, robust laser power meter for high power industrial applications, is now even better. See it in action. Ariel Power Meter.

FoldIR Zoom Lens for 5" (127mm) Gimbal Payloads
The FoldIR 25-275mm f/5.5 zoom lens is designed for 5" (127mm) payloads in drones and UAV's, offering a cutting-edge solution for the newly released low-SWaP 15µm VGA MWIR detectors. FoldIR Zoom Lens.

Blog Posts

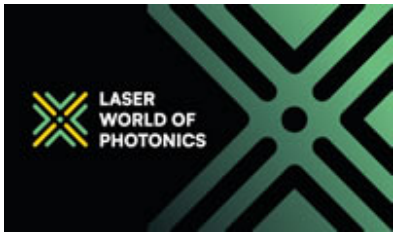
Destroy the Target, Not Everything Else: Beam Management in High-Power Directed Energy Laser Projects

By John McCauley, Sr. Business Development Manager, Ophir



High-powered directed energy laser systems are an efficient and effective way to neutralize threats. But changes always occur within a laser system, whether because of multi-kilowatt laser thermal effects or the impact of the surrounding environment. Understanding how these changes affect the overall system performance can only be achieved through measurement of the system's performance. Tools are now available to perform these measurements and, as a result, improve these system designs. As seen in *Naval Forces* magazine: Directed Energy Laser Systems.

See What's New at Laser World Photonics



Stop by MKS booth #A3.314 at Laser World of Photonics 2025 in Munich to see what's new in laser beam profiling, power/energy measurement, and IR optics, June 24-27.

Featured new products:

- **150K-W Ultra-High Power Meter**, water-cooled thermal power/energy laser sensor for ultra-high powers in demanding industrial and defense applications; 200 mm aperture.
- **70K-W Ultra-High Power Meter**, water-cooled thermal power/energy laser sensor for ultra-high powers in demanding industrial and defense applications; 130 mm aperture.
- **20K-W-BB-55 High Power Sensor**, water-cooled thermal power/energy laser sensor for high powers in demanding industrial and defense applications; 55 mm aperture.
- **Helios Pro Industrial Laser Power Sensors**, measure high power industrial lasers up to 12 kW.
- **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.

Applications

Enhancing Quality and Reliability in Metal Additive Manufacturing: The Role of Laser Calibration

In metal AM, ensuring consistent quality requires meticulous laser calibration and process control. 3D Systems addresses this need by integrating advanced laser beam analysis and power measurement solutions from MKS's Ophir brand. By leveraging Ophir's high-precision sensors, 3D Systems enhances laser performance monitoring and process stability, helping its customers meet stringent industry standards and produce the highest-quality metal AM components. Read the case study in *Metal Additive Manufacturing* magazine: Flip Book, PDF Download.

What's New

Tackling Laser Astigmatism with BeamSquared SP204S-PRO

Astigmatism in laser beams is an optical aberration where the beam does not focus to a single point due to differences in the curvature of the optical elements in the horizontal and vertical planes. This results in the beam having different focal points for the horizontal and vertical components, leading to an elliptical or distorted beam shape. Accurate measurement of astigmatism in laser beams is crucial. Laser Astigmatism.

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

In industrial laser processing, operators typically have two main options. In-Process Monitoring and At-Process Monitoring. Here's how to choose the approach that's right for your application. Industrial Laser Processing.

Sharpen Your Laser Game: The Essential Guide to Beam Profiling

Whether your laser beam applications are used for the medical, industrial, electronic, automotive, or defense industries, beam profiling is crucial to maintain the integrity of the laser. Beam Profiling.

Product Overview: 3A-IS Integrating Sphere Sensor

Measuring a widely diverging, low-power beam - such as those from laser diodes or fibers - presents unique challenges due to the beam's divergence. This is where the 3A-IS family of Integrating Sphere Sensors comes in. Integrating Sphere.

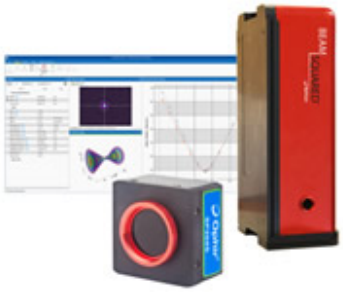
How Do Pyroelectric Sensors Work?

Pyroelectric sensors are commonly used to measure lasers with repetitively pulsed beams, where capturing every pulse is essential. Take a look at how they're revolutionizing laser measurement. Pyroelectric Sensors.

Innovative Measurement Technology Enables Next Level Industrial AM

Reichenbacher Hamuel GmbH has embraced the potential of Additive Manufacturing, developing large-format industrial laser powder bed fusion (LPBF) machines equipped with multiple laser beams. Industrial AM.

M^2 Laser Beam Propagation Analyzers for High Precision Beam Caustic and Profiling in Production Environments



The Ophir BeamSquared® SP204S-PRO M^2 analyzer is a precision beam caustic and profiling system for advanced laser manufacturing in semiconductor, display manufacturing, medical systems, defense, and industrial applications. A compact, fully automated tool, it quickly and accurately measures the propagation characteristics of standard and large diameter CW and pulsed lasers with extended Rayleigh ranges (up to 40 meters).

The Ophir BeamSquared® SP1203 analyzer, which includes the Ophir SP1203 GigE beam profiler, is a high-resolution beam profiler able to precisely measure smaller beam diameter lasers (up to 150 µm in the SWIR and NIR range) with larger Rayleigh lengths that need to be focused into tighter spots. M^2 Beam Propagation Analyzers.

70KW Ultra-High Power Laser Sensor for Industrial and Defense Applications

The Ophir® 70K-W Ultra-High Power Laser Sensor is a water-cooled, calorimetric sensor that measures powers from 2 kW to 70 kW across the spectral range of 900 - 1100 nm and 10.6 µm. The lightweight design and multiple interfaces - including Ethernet and RS232 - for communication, analog output, and real-time laser power monitoring output, allow easy integration into industrial and defense applications. Exceptionally low back reflection of <0.5%. 70KW Laser Sensor.

MWIR Zoom Lens for Next-Gen Cooled MWIR 5µm SXGA Detectors

The Ophir SupIR 10-135mm f/1.8 Motorized Continuous Zoom MWIR Lens is a compact, high-performance lens designed for next-generation 1280x1024 SXGA cooled MWIR detectors with a 5µm pixel pitch. The lens delivers superior image resolution and long-range detection for security and surveillance and defense thermal imaging applications. SupIR 10-135mm Zoom Lens.

MWIR Folded Zoom Lens for Drone and 5" (127mm) Small Gimbal Applications

The Ophir FoldIR 25-275mm f/5.5 MWIR Continuous Zoom Lens is a lightweight, compact, continuous zoom lenses designed specifically for drones. Designed for the newly released low-SWaP (Size, Weight, and Power) cooled VGA detectors, it offers an innovative solution for smaller size 15µm pitch VGA FPA (focal plane array) detectors.

Catalogs: Power Meters, Beam Profiling, IR Optics

The 2025 Ophir Laser Measurement Catalogs include tutorials and product specifications for laser power meters and beam profiling systems.

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, Also features a wide selection of 1-FOV and multiple FOV IR lenses. 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

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

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

FABTECH
8-11 September 2025
Chicago, IL, USA

China International Optoelectronic Exposition (CIOE)
10-12 September 2025
Shenzhen, China

Seoul ADEX 2025 (Aerospace & Defense Exhibition)
20-24 October 2025
Goyang-Si, Republic of Korea

Photonix
12-14 November 2025

FoldIR 25-175mm Zoom Lens.

Webinars

High Power Laser Measurement: Challenges and Solutions
On-Demand
Speaker: Mark Slutzki, Product Manager, MKS Ophir
Monitoring laser behavior in high-power applications is critical to keeping your process running properly. However, monitoring the laser itself is not trivial. There are many "little things" one could do that might unknowingly mess with the measurement, or even damage the instrument. For example, at what point should the cooling water be turned on or how should the water channels be purged of water residue after use? Getting issues like these wrong could damage your expensive laser power sensor. In this *Laser Focus World* webinar, you'll learn what these potential challenges include and best practices for how to deal with them correctly. High Power Laser Measurement.

Research News

Coherent Dispersive Wave Emission
Efficient generation of coherent dispersive wave with ultra-broad bandwidth has proved difficult to realize. The authors unveil a new approach to soliton dynamics in which the dispersive wave emission process couples with the splitting dynamics of the driving pulse, giving rise to high-efficiency generation of coherent dispersive wave in the UV region. The highly-coherent, octave-wide UV spectrum is generated from a simple capillary fiber set-up. Pulse energy was measured by an Ophir 3A-P thermal power meter. Energy measurements were taken by an Ophir PD300-UV photodiode sensor. Beam profiles were measured with an Ophir SP932U CCD camera. Soliton Dynamics.

IR Beam Shaping on Demand
Direct laser writing promises a simple and convenient alternative to fabricating optical metasurfaces. The authors exploit the non-volatile laser-induced insulator-to-metal transition of the plasmonic phase-change material In_3SbTe_2 (IST) for optical programming of large-area metasurfaces for infrared beam-shaping. This facilitates fabrication of large-area metasurfaces within hours, enabling rapid-prototyping of customized infrared meta-optics. Hologram pattern changes and beam intensity profiles were measured by an Ophir Pyrocam IV camera. IR Beam Shaping.

Frequently Asked Questions

Q: Is it cost effective to replace the imager in a Pyrocam camera?
A: Yes, it is very cost effective to replace the imager in a Pyrocam. It is typically less than half the cost of the price of a new camera and can be done in a couple of days. Contact our Calibration department at calibration@mksinst.com to arrange for an RMA to send your Pyrocam in for evaluation and repair.

Q: Why are the SP620 and SP503 cameras no longer supported in the latest version of BeamGage software?
A: The SP620 and SP503 cameras have been great cameras for a very long time. Unfortunately, we have not been able to repair them for some time. As a result, we are no longer able to support servicing these and a few other cameras during testing processes of newer versions of the BeamGage software. We reached a point where we needed to remove them from the latest version of the BeamGage software. If you need an old version of software that will still support these cameras, please reach out to our Product Support team at service.ophir.usa@mksinst.com.

Tokyo, Japan

Milipol
18-21 November 2025
Paris, France

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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.

3050 North 300 West, North Logan, UT 84341
Tel: +1 435-753-3729
www.ophiropt.com/photonics