

ePulse: Laser Measurement News

The true measurement of laser performance



ePulse: Laser Measurement News September 2023

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

Femtowatts to Nanowatts: Measuring Signals Below the Noise Floor with a Lock-In Amplifier

By Shimon Elstein, Sr. Physicist, MKS Ophir

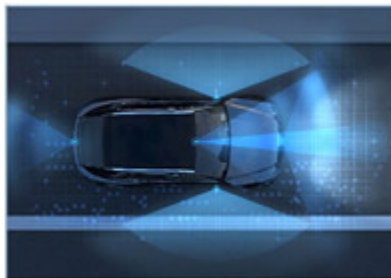
Measuring optical signals in the femtowatt (10^{-15}) to nanowatt (10^{-9}) range can be a daunting task. Signal levels this low are lost in typical detector noise levels and swamped by background light. The noise floor for photodiode detectors operated with a small bandwidth (~ 10 Hz) is on the order of 1 picowatt (10⁻¹²). Further narrowing of the bandwidth by filtering or averaging will only provide a small additional reduction in the noise level. Here's what you need to know about [measuring low signals](#).



LIDAR: Measuring the Measurement System is Essential

By Simon Rankel and John McCauley, MKS Ophir

While LiDAR applications are wide ranging, the development of these systems are still improving with respect to areas such as eye safety, power consumption, and overall system reliability. Measuring and understanding key LiDAR parameters such as average power or pulse energies, wavelengths, pulse duration, repetition rates, and beam divergence are critical to successful development of LiDAR systems. [LIDAR Measurement](#).



Audio Blog

Ophir is dedicated to bringing you the latest technologies and innovative solutions, in laser measurement and in content consumption. We have made it easier for you to engage with our content through our Audio Blog

Videos of the Month

Auto Range: Issues to Be Aware Of

When we don't know in advance what power to expect (and, therefore, what range to choose), a laser power meter's "Auto Ranging" feature is very helpful. Take a look at how the Auto Range function works, and how not to be taken by surprise by some of its "side effects."

[Auto Ranging](#).



BeamPeek™, High Power Laser Beam Analysis and Power Measurement System for Additive Manufacturing

The Ophir BeamPeek™ 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. [BeamPeek](#).



Helios Plus, Industrial Laser Power Meter Family

Designed with factory automation in mind, the Helios Plus systems measure high power lasers in industrial settings. They feature a robust, industrial design for harsh environments, and a range of communication interfaces for easy integration into factory networks. [Helios Plus](#).

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Applications

Additive Manufacturing: From Prototyping to Serial Production

Lightweight, complex mechanical parts can now be "built to order" quickly and automatically, thanks to Additive Manufacturing (AM) technologies. Reproducibility is key, and that means tight monitoring of the relevant laser parameters. The beam's power, as well as its focal spot location and shape, must be very stable across the full working field, for every layer, across multiple beams and perhaps multiple systems, over time. [Additive Manufacturing](#).



Webinars

Maximizing Laser Performance: How to Set Up Power Meters and Beam Profilers

Speaker: John McCauley, Sr. Business Development Manager, MKS Ophir
Wednesday, September 20, 2023, 1pm eastern

Measuring key laser performance characteristics - for example, output power, beam size and shape, and focused spot location - help laser operators ensure the overall success of the system. Whether you're a systems integrator or a laser technician, the setup and use of the analysis equipment can be overwhelming. In this webinar, sponsored by *Laser Focus World*, we'll discuss best practices in the configuration and setup of laser power meters and beam profilers used in production operations. [Laser Performance](#).

Unlocking the Future of Low-SWaP Thermal Imaging: Design Challenges and Performance

Speaker: Nissim Asida, Sr. Director of R&D and Engineering, MKS Ophir Optics

Thursday, September 21, 2023, 10am eastern

In this *Photonics Spectra* sponsored webinar, we review breakthroughs in IR zoom lens development, addressing the demanding requirements for reduced size, weight, and power (SWaP) while enabling high-resolution vision and long-range detection in harsh environmental conditions and constrained platforms such as airborne and handheld systems. We discuss the performance and design challenges of advanced folded optics and lightweight zoom lenses optimized for next-generation IR thermal imaging systems and applications. [Low SWaP Imaging](#).

Overcoming the Challenges of Measuring Diverging Beams in Biophotonics Applications

Speaker: Mark Slutzki, Product Manager, MKS Ophir

Thursday, October 26, 2023, 12:30pm eastern

The light sources used to extract details in biophotonics applications are almost always diverging or converging, and measuring such beams accurately can be tricky. This webinar, sponsored by *BioPhotonics*, will address the challenges in accurately measuring diverging and converging beams (such as fully capturing a widely diverging beam, angular dependence of the sensor responsivity, beam clipping for small active areas) and how to overcome them. [Diverging Beams in Biophotonics](#).

Creating Quality Parts Using Laser Welding

Speakers: Markus Ruetering, VP EMEA Sales, MKS Ophir, and Richard Steinbrecht, Managing Director, Lessmüller Lasertechnik



Laser Measurement PC Interfaces

If all your laser measurement work involves a laptop or a PC, check out Ophir's direct-to-PC interfaces. They are full-fledged Laser Power and Energy meters that use the PC as your display. [PC Interfaces](#).



FoldIR 30-450mm f/3.4 Folded Optics Zoom Lens

Meet the Ophir® FoldIR 30-450mm f/3.4 continuous zoom lens, a long-range, compact folded optics IR zoom lens for gimbal systems and payloads. The new lens features an innovative folded design that significantly shrinks the lens size and reduces the overall volume of the integrated system in which it is used. [Folded Optics Zoom Lens](#).



Social Media: Blog

Manufacturing Trends Drive Advancements in Laser Beam Measurement Technology

As laser applications have evolved, so has the typical laser user. Today, lasers are used in a wide variety of environments in an ever-increasing number of applications. As a result, developers of these laser-based products now realize the importance of measuring the laser's performance. Let's take a look at the latest trends. [Manufacturing Trends](#).

Luminous Quality For Optimal Photobiomodulation

Lichtblock GmbH has developed a compact light system that radiates red light in wavelengths of 630, 660, and 850 nm. To test the quality of the systems and document their effectiveness, the company uses an Ophir® power gauge from MKS. [Optimal](#)

Tuesday, October 31, 2023, 11am eastern

Laser welding is one of the most used joining techniques in sheet metals for such applications as car bodies, medical devices, sensors, and batteries. To create successful welds in serial production, many parameters must be kept within a defined window of specifications. In this webinar, sponsored by *Photonics Spectra*, Ophir and Lessmüller join forces to offer a full picture of the necessary and possible measurements needed during the entire laser welding process. [Laser Welding](#).

What's New

New Website is Live!

We are thrilled to announce the launch of our new website, which unites the Ophir and MKS Instruments products under one roof. Changes include easier-to-use product pages, and an updated Resources section with access to Ophir's calculators, our Photonics blog, software, and literature, including technical articles, videos, manuals, and webinars. The "Support" section lets you see returns and RMA requests, ISO accreditation and certificates, news and press releases, ePulse newsletters, and webinars. [MKS Ophir Website](#).



FoldIR 30-450mm f/3.4 Compact, Folded Optics Zoom Lens for MWIR Cameras

The Ophir® FoldIR 30-450mm f/3.4 continuous zoom lens is a long-range, compact folded optics IR zoom lens for gimbal systems and payloads. It provides a rich combination of features: a weight of less than 2kg, a long-range detection capability of over 20km, a sharp image across the entire field-of-view with continuous zoom capabilities, and compatibility with SXGA/HD 10µm cold MWIR detectors. [FoldIR Lens](#).



IR Lenses 2023 Catalog

Discover Ophir's new continuous zoom lenses: SWIR & NIR lenses for 5µm, 10µm SXGA & 15µm VGA SWIR detectors; MWIR lenses for 10µm / SXGA detectors; MWIR lenses for 15µm VGA detectors; extended observation ranges lenses; and low-SWaP lenses. [IR Lenses 2023 Catalog](#).



[Photobiomodulation](#).

Plant Manufacturer Integrates Laser Measurement Technology Product

To ensure high quality, Körber Business Area Technologies counts on seamless monitoring of the entire manufacturing process in the plant. This includes a custom Ophir sensor to measure laser power and an Ophir OEM quad sensor to measure the position and power of the beam. [Laser Measurement Technology Product](#).

Catalogs: Power Meters, Beam Profiling, IR Optics

The [2023 Ophir Laser Measurement Catalogs](#) include tutorials and product specifications for laser power meters and beam profiling systems.

The [2023 Ophir IR Optics Thermal Imaging Lenses Catalog](#) includes a wide range of LWIR, SWIR, 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

[Photonix Japan](#)
October 4-6, 2023
Tokyo, Japan

[ADEX Seoul](#)
October 17-22, 2023
Seoul, South Korea

[Formnext \(TCT\)](#)
November 7-10, 2023
Frankfurt, Germany

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Research News

Time-Resolved Circular Dichroism of Excitonic Systems

A new experimental setup is presented for femtosecond time-resolved circular dichroism (TRCD) spectroscopy of excitonic systems are presented using a polarization grating as key element to generate circularly polarized pulses. Spatial characterizations of the beams were carried out with the help of the Ophir SP928 laser beam analyzer and Ophir BeamGage® software. [Time-Resolved Circular Dichroism Spectroscopy](#).

Open-Circuit Voltage in Ternary Organic Solar Cells

This research provides two design rules for enhancing the VOC in ternary organic solar cells (TOSCs): high emission yield for the guest binary blend and similar charge-transfer-state energies for host/guest binary blends; high miscibility of the guest component with the low gap component in the host binary blend. The intensity of the pump (pump energy) was modulated using neutral density filters and measured using an Ophir Vega power meter. [Ternary Organic Solar Cells](#).

Technical Notes

Beam Profiling

Integrated Solutions: Interconnecting Ophir Products and Accessories. [Read the Tech Note](#).

Power Meters

How to Use Water-Cooled Ophir Sensors. [Read the Tech Note](#).

Blog

[The Ophir Laser Measurement Group](#)

Web

www.ophiropt.com/photonics

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 CO₂ 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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