

ePulse: Laser Measurement News

The true measurement of laser performance



ePulse: Laser Measurement News May 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

Sensor Fusion Enables Comprehensive Analysis of Laser Processing in AM

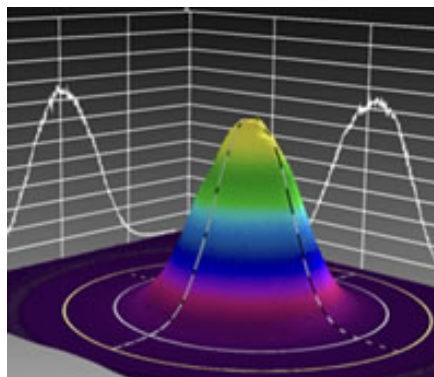
By Kevin Kirkham, Sr. Manager, Market Development, MKS Ophir

New laser processes, such as additive manufacturing (AM) techniques using laser powder bed fusion (LBPF), require consistent energy be delivered to the metal powder material that is to be transformed. Successful outcomes require the power density distribution of the laser beam, as it is delivered to the weld plane, to be symmetrical, uniform, and stable. Beam spot size and intensity must be maintained within a finite acceptance window. How do we know the laser is delivering exactly the beam that is needed? [Sensor Fusion](#).



Audio Blog: Can a Laser Wavelength Be Converted? Why Would We Want To?

The wavelength of a laser is a fundamental characteristic, determined by the gain medium and its internal structure. Not all wavelengths can be generated from lasers with the required parameters needed for a given application, such as power or energy. When other laser wavelengths are needed, some type of wavelength conversion is typically used. In this article we will present situations in which converting the wavelength of laser light is advantageous for specific applications, and outline processes that enable such wavelength conversion. [Laser Wavelength](#).



Videos of the Month

How to Measure Low Power, Slowly Pulsing Beams

Measuring low-power, slowly pulsing beams using photodiode sensors can be surprisingly tricky. Learn about the technical challenges you'll face when trying to measure such beams, and about the Ophir solutions that will help you. [Measuring Beams](#).



How to Use Ariel All-in-One High Power Laser Sensor

Learn how to use the Ariel, Ophir's ultra-compact "All in One" sensor for measuring high power industrial lasers up to 8KW. [Ariel High Power Laser Sensor](#).



Using the Centauri Meter

In this short series of videos, learn how to use the Centauri, Ophir's Advanced Touch-Screen Laser Power Meter. [Centauri Meter](#).



Case Studies

Precision Manufacturing Relies on OEM Laser Power Sensors

Production systems for the luxury food and tobacco industries are complex, achieve very high throughput rates, and often run 24/7. To ensure the products' high quality, Körber Business Area Technologies counts on seamless monitoring of the entire manufacturing process. This also applies to the laser-based perforation systems that the company integrates into its lines. MKS developed a customized Ophir® OEM sensor to measure laser power, which can be integrated directly into the equipment. For maintenance, the manufacturer uses an Ophir OEM quad sensor to measure the position and power of the laser beam. [OEM Laser Power Sensors](#).



Large Mode Area Fiber Testing at ALPhANOV

One of the main characteristics to be tested in large mode area (LMA) fibers is modal behavior. The ALPhANOV engineers needed a device that would deliver reliable and consistent measurements in order to be able to compare each fiber at the same level of quality. They needed a system that could quickly and easily measure alignment, including beam propagation ratio (M^2), astigmatism, and beam shape. Enter the Ophir BeamSquared beam propagation analyzer. [ALPhANOV](#).



Webinars

How Do You Know Your AM Laser is Performing to Spec?

Speaker: John McCauley, Sr. Business Development Manager, MKS Ophir On-Demand

How can you assure your AM laser is performing as needed to produce high quality, consistent builds? Some modern in-situ tools provide a partial picture of the performance of the lasers that are empowering your 3D laser printers, but they often don't tell the complete story because they capture only a portion of the laser system. In this webinar hosted by *Metalforming Magazine*, John McCauley discusses the what, why, and how around the latest innovations in uncooled power meters designed for the AM workspace, and self-contained laser beam profilers that provide views of the working beam and monitor the location of the beam waist and any focal shift that may be occurring. [AM Laser Measurement](#).

Measuring Long-Wavelength Lasers

Speaker: Kevin Kirkham, Sr. Manager, Market Development, MKS Ophir On-Demand

Using SWIR, MIR, and FIR lasers requires knowledge of their beam quality parameters. Numerous products and techniques have been developed to enable the measurement of beam quality parameters for long-wavelength light sources. In this webinar hosted by *Photonics*

Social Media: Blog

Laser Measurement Systems: Best Practices

A laser's performance is important for industrial laser materials processing. Here we provide a guide for the right and wrong ways to apply, ascertain, evaluate, and take action on the laser performance data gathered. [Laser Measurement Systems](#).

Evolution of Measurement Technology for Laser-Based AM Systems

How can one check all the relevant beam parameters on the building plane in a manufacturing plant? Confined spaces, metal powder in the build envelope, and high powers - the conditions for measuring the laser beam could hardly be worse. Let's take a look at several new products designed specifically for AM applications. [Evolution of Measurement Technology](#).

Destroy the Target, Not Everything Else

Lasers that push photons of the magnitude of multiple kilowatts of average or continuous-wave power are more susceptible to thermal effects on their components, as well as increased safety concerns. Additionally, the degradation of components can happen at a faster rate at these higher powers, more quickly resulting in less efficient performance of the system. Let's look at how these effects and changes to the laser's system affect overall system performance. [Beam Management](#).

Leverage Your Process, Protect Your Device

Measuring a laser is challenging. While choosing the right sensor is key, it is not the end of the story. Regular calibration of power and energy sensors, recertification of beam profilers, and expertise in handling the measurement device give you confidence in your measurement. [Protect Your Devices](#).

New Catalogs: Power Meters, Beam Profiling, IR Optics

Spectra, Kevin Kirkham discusses the types of measurement tools that are available for long-wavelength sources -- IR cameras, pyroelectric scanning-slit sensors, and wavelength conversion apparatus -- and which are appropriate for different application types. [Long Wavelength Lasers](#).

Durable IR Coatings for Maritime EO Systems

Speaker: Emi Yoffe, Process Development and Engineering Manager, MKS Ophir Optics On-Demand

In this webinar, Emi discusses durable IR coatings for maritime electro-optical (EO) systems. Topics covered include variable applications and environmental considerations, environmental durability tests, maritime environment challenges, and Ophir coatings for maritime environments. [Durable IR Coatings for Maritime EO Systems](#).

What's New

See What's New at LASER World of Photonics 2023

Stop by the MKS booth at LASER World of Photonics 2023 to see what's new in laser beam profiling, power/energy measurement, and IR optics. Booth W2.2420, June 27-30, 2023, Munich, Germany. Featured applications and products include:

- 3D printing & Additive Manufacturing: BeamPeek beam profiler for AM, Ariel power meter for AM, and BeamWatch AM integrated laser measurement system
- Automotive & EVs: BeamWatch Integrated beam profiler, Helios Plus high power sensor, and IPM-10K industrial power meter
- High Power Industrial: Ophir high power sensors
- Clean Energy: BeamSquared beam propagation analyzer
- AR/VR/MR Manufacturing Solutions: WB-I wide beam imager
- Motion & Micromachining: Ophir CM/SV sensors
- ...PLUS several new industrial beam profiling products!

SWIR Lens is Industry's First Compact, Low SWaP, Continuous Zoom Lens for 5µm and 10µm SXGA SWIR Detectors

The Ophir SWIR & NIR 25-250mm f/5.5 (NFOV) f/4.0 (WFOV) continuous zoom lens is the industry's first compact, rugged, low SWaP (Size, Weight, and Power) lens for the newly introduced 5µm and 10µm SXGA, as well as the 15µm VGA SWIR detectors. An innovative opto-mechanical design delivers a lens that is approximately 60% lighter than similar SWIR lenses while enabling a high-quality image with a detection range exceeding 26km. This is a disruptive enabler for advanced drones, coastal search and rescue, tactical UAV IR cameras, and more. [SWIR & NIR 25-250mm Lens](#).



Low-SWaP MWIR Lens for Drone and Small Gimbal Applications

The Ophir LightIR 10-135mm and 18-225mm MWIR f/3.6 continuous

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

[Laser World of Photonics](#)
June 27-30, 2023
Munich, Germany
Booth A3.219

[Laser World of Photonics China](#)
July 11-13
Shanghai, China
Booth W2.2420

[DSEI London](#)
September 12-15, 2023
London, UK

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

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zoom lenses are the newest additions to the LightIR family of low SWaP, high-performance, motorized continuous zoom lenses. The new lenses are lightweight, compact, thermal imaging lenses optimized for smaller size VGA 10 μ m FPA (focal plane array) IR detectors. [LightIR 10-135mm](#). [LightIR 18-225mm](#).



Research News

LED Photobiomodulation on Astrocyte Migration

This study evaluates the effect of PBM on astrocyte migration, drebrin (DBN) expression, and cytoplasmic morphology using primary cultured rat astrocyte. A 660-nm light-emitting diode (LED) with fluence of 6, 12 and 18J/cm² was applied. Both scratch assay and transwell assay showed significant difference in astrocyte migration following PBM irradiation. LED irradiance (mW/cm²) was measured using an Ophir Vega power meter and PD300-TP-ROHS power detector located under the middle of the LED. [Photobiomodulation](#).

Photovoltaic Conversion Schottky Devices Harvest Solar Energy Above 1.1 μ m

Traditional silicon solar cells can only absorb the solar spectrum at wavelengths below 1.1 μ m. This research provides a breakthrough in harvesting solar energy below Si bandgap through conversion of hot carriers generated in the metal into a current using an energy barrier at the metal–semiconductor junction. Penetrating light was measured using an Ophir Nova II meter. [Solar Energy](#).

FAQs

Power Meters

When a thermal sensor is sent for service due to some damage or contamination, when does it need a disc replacement and when does it not? [Read the FAQ](#).

Beam Profiling

Is my NanoScan 2s system supported on Windows 11? [Read the FAQ](#).

Is there an SDK to control the BeamGage camera? [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 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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