

ePulse: Laser Measurement News

The true measurement of laser performance



ePulse: Laser Measurement News May 2024

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

Innovative Measurement Tool Optimizes Development of LPBF System

By Dr. Alexander Kawalla-Nam, Reichenbacher Hamuel GmbH, and Roland Heinze, MKS Ophir

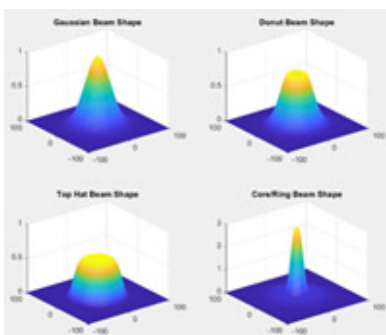
Additive manufacturing methods - even in combination with machining treatments - are paving the way for more efficient processes and innovative designs. Reichenbacher Hamuel has recognized this potential. In short order, the company developed industrial additive manufacturing systems based on the laser powder bed fusion (LPBF) process. The Ophir BeamPeek high-power laser beam analysis and power measurement system plays a decisive role in R&D and QA/maintenance. As seen in *Photonics Views* magazine. [Innovative Measurement Tool for LPBF System](#).



Beam Width Measurement Methods: A Review of the D4 σ (Moving Slit) and D4 σ (Iterative) Methods

By Fon Brown, Rachel Callaway, and Oleg Zinoviev, MKS Ophir

This article describes the accuracy and capabilities of the BeamWatch Rayleigh scatter beam profiling system and compares the D4 σ (Moving Slit) and D4 σ (Iterative) beam width measurement methods. Each method conforms to its respective section in the ISO standard and therefore produces the ISO labels in the BeamWatch application when sufficient Rayleigh Lengths are visible. This allows users to obtain accurate measurements for a wider range of beams and measurement conditions. [Beam Width Measurement Methods](#).



Videos of the Month

Ophir Laser Measurement Virtual Meters

If all your laser measurement work involves a laptop or a PC, one of Ophir's direct-to-PC virtual meters could be an ideal solution. These are full-fledged Laser Power and Energy meters, and - together with the sensor and Ophir's powerful StarLab software application - turn your PC into a full-function, multi-channel laser measurement workstation. [Virtual Meters](#).



Introducing: Certificate of Calibration

The Certificate of Calibration (C.O.C.) certifies that your Ophir instrument meets all its specifications. It tells you - quantitatively - exactly how accurate your Ophir measurement instrument is. [Certificate of Calibration](#).



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

The newly patented 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.

Applications

Lasers in Directed Energy Applications

Lasers are changing the ways our soldiers and sailors are neutralizing targets. It is a rapidly emerging technology sector that allows our armies and navies to operate more efficiently during conflicts. The recent development of products that handle tens and even hundreds of kilowatts of laser light has allowed for the continued development of more accurate and safe laser-based weapons systems. [Measuring Lasers in Directed Energy](#).

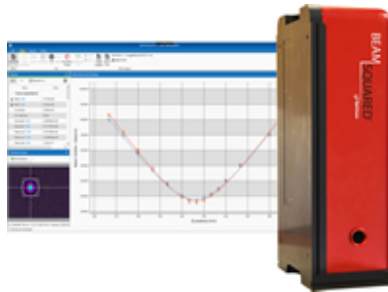
SWIR Laser Beam Profiling

SWIR, and especially 1550nm lasers, are eye-safe and provide the high contrast required for high-resolution imaging. They are frequently used as LIDAR for remote sensing applications and face recognition. Beam profiling is often required as a diagnostics tool to track power distribution stability. As the sensors of standard beam profilers are unable to detect wavelengths above 1100 nm, Ophir offers a line of cameras with phosphor coating on a standard silicone sensor. This coating is designed to absorb 1440-1605 nm incident photons and emit visible photons toward the sensor, enabling beam profiling for SWIR wavelengths. [Phosphor-Coated CMOS Beam Profiler](#).

What's New

Ophir BeamSquared® SP204S M² Beam Propagation Analyzer

The Ophir BeamSquared® SP204S M² beam propagation analyzer is a robust, portable device that helps users optimize laser performance automatically and accurately. It measures the propagation characteristics of CW and pulsed lasers with Rayleigh length up to 20 meters in less than one minute. The system uses CMOS camera technology to deliver higher spatial resolution, better sampling accuracy, and improved SNR (signal to noise ratio) than CCD-based cameras. Designed for continuous use applications, the BSQ SP204S measures wavelengths from 266nm to 10.6μm, including CO₂ and terahertz. [Ophir BeamSquared SP204S](#).



MKS Enhanced IP Portfolio with Patent for Ophir BeamPeek®

We are pleased to announce the award of a new patent for the groundbreaking architecture of Ophir BeamPeek®, an integrated beam analysis and power measurement system for additive manufacturing. The patent covers a unique, dual-compartment design that minimizes thermal energy transfer between system modules. One unit houses the optical sensors, while the other is home to a beam dump tray. The design allows the beam dump to absorb nearly all the energy of the beam, safeguarding the optical sensors and enabling operation without the need for water or fan cooling. The ability to replace the trays eliminates downtime between measurement sessions. [Ophir BeamPeek Patent](#).

Ophir Blog Upgrade

After much hard work, we're thrilled to announce a major upgrade to our Laser Measurement Blog website! Over the past 14 years, our team of experts has diligently gathered and created an immense amount of content and now we're providing easy and engaging access to this treasure trove of knowledge. [Ophir Laser Measurement Blog](#).

between measurement sessions. [Ophir BeamPeek](#).



Blog Posts

Ophir BeamSquared® Upgrade: Practical Insights and Technological Shifts

Stepping into 2024, MKS Ophir BeamSquared® analyzer is set to undergo a notable upgrade. The upcoming change revolves around the integration of the SP204S backside illuminated CMOS camera, signaling a shift in the gears of optical analysis. [Ophir BeamSquared](#).

Quality Pays Off: European Service Lab Receives ISO Accreditation

The ISO/IEC 17025 accreditation of our European calibration and service center in Darmstadt, Germany, covers MKS Ophir's photodiode, pyroelectric, and thermopile laser power and energy sensors, as well as its power and energy displays and virtual meters. [ISO/IEC 17025 Accreditation](#).

Catalogs: Power Meters, Beam Profiling, IR Optics

The [2024 Ophir Laser Measurement Catalogs](#) include tutorials and product specifications for laser power meters and beam profiling systems.

The NEW [2024 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

Make in India: Ophir® IR Zoom Lenses

MKS Instruments is proud to announce new assembly, support, and service capabilities in India for Ophir cutting-edge infrared (IR) Optics products. These new capabilities align seamlessly with the Indian Government's 'Atmanirbhar Bharat' 'Make in India' initiative, demonstrating MKS' commitment to India's national security industry. [Make in India](#).



Defense & Security IR Thermal Imaging Innovations to be Showcased at Eurosatory, France

At Eurosatory 2024, June 17-21, the Ophir Optics group will showcase the latest advancements in defense and security IR thermal imaging in Hall 6, booth G242. Featured products include long-range IR zoom lenses with exceptional image quality, compact low-SWaP IR zoom lenses designed for airborne and handheld systems, and high-precision IR optical components. [Eurosatory 2024](#).

Ophir LightIR MWIR Zoom Lenses

Designed for VGA 10μm MWIR cooled cameras, the LightIR f/3.6 lenses are ideal for low-SWaP and small gimbal thermal imaging for drones and tactical UAVs in commercial, homeland security, and defense markets. [LightIR MWIR Zoom Lenses](#).



Webinars

Solid-State Light Sources: Understanding the Performance of VCSELS, Laser Diodes, and LEDs

June 12, 2024

Speaker: Kevin Kirkham, Sr. Business Development Manager, MKS Ophir
VCSELS, Laser Diodes, LEDs, and other solid-state light sources have become mainstays in our lives. Parameters critical to their performance include spectrum, divergence, mode, intensity, and more. Carefully constructed testing confirms the performance of good devices and allows for underperforming devices to be identified and eliminated. In this *Photonics Spectra Laser Test & Measurement Summit* session, Kevin will discuss these key parameters and the types of measurement tools that can assure their performance before they are packaged or additional investments are made [Solid-State Light Sources](#).

Laser Characteristics that Drift and How to Manage the Changes On-Demand

Speaker: John McCauley, Sr. Business Development Manager, MKS Ophir
Lasers used for material processing face two general challenges over the course of their lives. First, these lasers operate at relatively higher power levels compared to other applications. Second, the environments are usually harsh. These issues can cause the laser's performance to drift over time, causing adverse effects on their processes. In this *Photonics Spectra* webinar, John discusses which laser performance characteristics are meaningful to measure; when, and at what frequency, these characteristics should be measured; and how changes in these characteristics relate to the process. [Laser Drift](#).

Research News

markets from MKS.

[Focus on Photonics Newsletter](#) for innovations in lasers, opto-mechanical components, vibration and motion control, and laser characterization.

[Ophir IR Optics Newsletter](#) for the latest developments in thermal imaging optics.

Trade Shows

[Eurosatory 2024](#)

June 18-21, 2024
Paris, France

[31st Advanced Laser Applications Workshop \(ALAW\)](#)

June 25-27, 2024
Novi, Michigan

[Laser Korea](#)

July 3-5, 2024
Gyeonggi-do, South Korea

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Minimally Invasive Management of Vital Teeth Requiring Root Canals

The use of minimally invasive root canal preparation techniques where the root canal is not instrumented and is disinfected by light followed by obturation with a hydraulic cement sealer reduced the microbial load and preserved the dentin thus may be an attractive treatment option for management of vital teeth needing root canal therapy. Laser power was measured using an Ophir PD300R silicon photodiode sensor with StarLab 3.0 software. [Minimally Invasive Root Canal Techniques](#).

Ultra-Broadband Gratings for Near-Single-Cycle 100 Petawatt Lasers

Compressing high-energy laser pulses to a single-cycle and realizing the " λ^3 laser concept" will break the current limitation of super-scale projects and contribute to the future 100-petawatt and even Exawatt lasers. The authors have realized ultra-broadband gold gratings, core optics in the chirped pulse amplification, in the 750–1150 nm spectral range with $\alpha > 90\%$ –1 order diffraction efficiency for near single-cycle pulse stretching and compression. The high-spectral-resolution diffraction efficiency spectra were measured with Ophir PD300-UV and Ophir PD300R-IR detectors. The beam profile on the focal plane was imaged onto an Ophir SP907 CCD device. [100 Petawatt Lasers](#).

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 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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