ePulse: Laser Measurement News

The true measurement of laser performance

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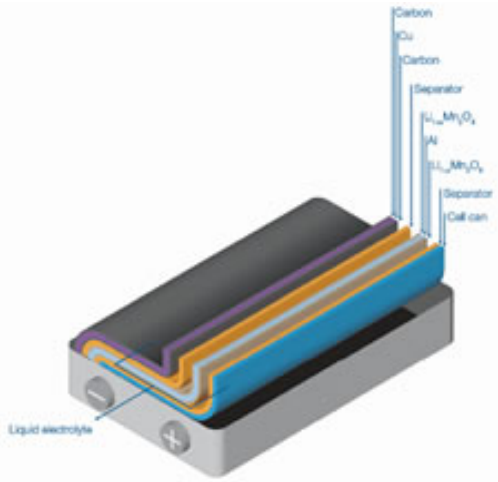
November 2023

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.

Features

Laser Applications in EV Car Batteries

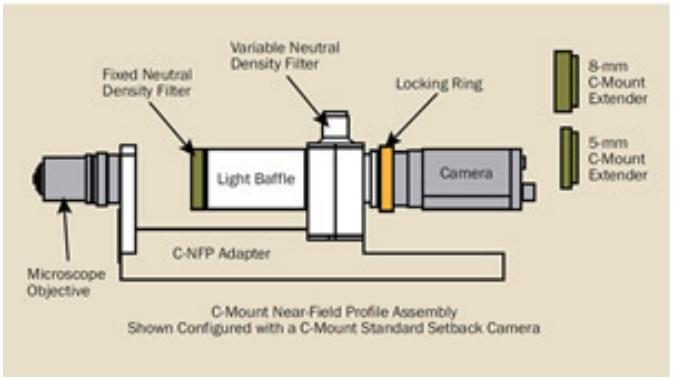
By Efi Rotem, Director, R&D and Engineering, MKS Ophir



One of the most important parameters for a Li-ion battery pack is the charge capacity per weight in kWh/kg. This means that battery and car makers want to put in as many 'battery cells' (the basic Li-ion unit that stores charge) as possible, and get rid of anything else, such as modular housings. This is where lasers are needed to improve reliability and throughput of cleaning, cutting, and welding at the cell level, and in battery pack frames and power harnesses. EV Car Batteries.

Measuring Small Beam MFD: Overcoming the Challenges

By Derrick Peterman, Sales Director, MKS Ophir



Small beams are used in many critical applications yet often they are not directly profiled. While obtaining good beam profiling data on beams under 10µm has its challenges, they can be overcome with proven techniques. Measuring Small Beam MFD.

Videos of the Month

Laser Measurement PC Interfaces
If all your laser measurement work involves a laptop or a PC, rather than a stand-alone meter, one of Ophir's direct-to-PC interfaces could be an ideal solution. These are full-fledged Laser Power and Energy meters, but instead of having a separate on-board display, the PC becomes your display. PC Interfaces.

How to Use the StarViewer Android App to Operate the Ariel
In this short video, you'll learn how to use the StarViewer Android App to operate the Ariel, Ophir's ultra-compact self-contained industrial power meter. StarViewer App.

Fundamentals of Beam Profiling
Learn how to measure your laser beam, find out which different shapes of "beam profile" or spatial energy distribution are required for different laser applications, such as welding and cutting and check out the impact that laser beam diameter has on laser power density. Beam

Audio Blog

The Korber Case: Where Precision Manufacturing Relies on Customized Laser Power Sensors

Körber Business Area Technologies develops tailor-made systems for the luxury food and tobacco industries. Production lines for these industries are often complex and run 24/7. Measuring laser power during production is critical for maintaining product quality. Working in tandem with Korber, Ophir developed two customized OEM sensors that are integrated into the production line: a power-measuring sensor that continuously monitors and displays average power, and a quad sensor to measure the power and position of the laser beam. Audio Blog.

Applications

Wanted: The Perfect Beam for Photopolymerization

By Dagmar Ecker, MBE, MKS Ophir

Axtra3D was founded in 2021 with the ambitious goal to shake up the additive manufacturing industry. Only one year later, the company introduced its Hybrid PhotoSynthesis (HPS) technology, which is transforming the market. HPS is the first coaxial system to allow the user to print fine features very fast and with superior surface finishing. The innovation is based on a photopolymerization process with two light sources: a digital projector combined with a solid-state laser. Key to the technology is perfect synchronization of the laser beam with the light. With MKS technology, the company achieves the ideal fit and relies on Ophir measurement devices during the whole product cycle. Photopolymerization.

IR Thermal Imaging Lenses for Counter Unmanned Systems (C-UAS)

The proliferation of drones raises potential security threats to both civilian and military entities. Such threats triggered rapidly emerging Counter-Unmanned Aerial Systems (C-UAS) technologies. Their mission is to detect, identify, and disable such threats. Infrared (IR) imaging combined in multi-sensor type systems enables the detection, identification, and tracking of small unmanned aerial systems (UAS). Counter Unmanned Systems.

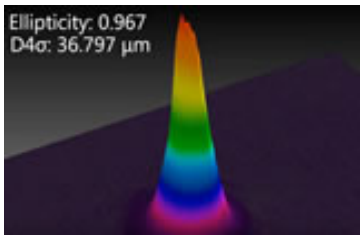
On-Demand Webinars

Understanding Laser Energy Measurement & How Laser Energy Measurement Works

Speaker: Mark Slutzki, Product Manager, MKS Ophir

If you need to measure laser pulse energies, you have probably run into a variety of issues and concepts that seem to cause confusion. In this webinar, we'll address those issues, including: how energy measurement works (short basic version…), how to make sure you are getting accurate readings, and how to avoid out-of-tolerance issues with your measuring tools. Laser Energy Measurement.

Profiling.



Social Media: Blog

A Safe Way to Better Vision

There are many challenges in the development and production of laser systems for medical applications – and the safety requirements are significant. WaveLight GmbH, a subsidiary of Alcon and market leader in refractive surgery, successfully uses products from MKS Instruments in the development, production, and maintenance of its high-quality laser systems. Refractive Surgery.

Green and Blue Laser Welding

Laser welding, cutting, and cladding have become increasingly popular and, in most cases, have been performed at the NIR wavelength region. However, NIR lasers are less efficient for copper processing due to high reflectivity and therefore low energy absorption. Operation in green or blue wavelengths allows the use of significantly less power to achieve the same welding results. Laser Welding.

The 3 Ms of Laser Cutting Performance: Monitoring, Measuring, and Maintenance

Maintaining performance throughout a laser cutting or welding process is critical to achieving high-quality results and preventing damage to materials. This is best done by **monitoring** the process and **measuring** certain laser parameters, to identify issues and allow for preventative **maintenance**. Laser Cutting Performance.

Catalogs: Power Meters, Beam Profiling, IR Optics

The 2023 Ophir Laser

Creating Quality Parts Using Laser Welding
Speakers: Markus Ruetering, VP EMEIA Sales, MKS Ophir, and Richard Steinbrecht, Managing Director, Lessmüller Lasertechnik
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.

Overcoming the Challenges of Measuring Diverging Beams in Biophotonics Applications
Speaker: Mark Slutzki, Product Manager, MKS Ophir
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.

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
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.

What's New

Innovative Solutions Engineered to Drive Mobility
As a long-standing and reliable partner to the automotive industry, MKS Instruments has a deep understanding of the requirements of automotive manufacturers and their suppliers. With our profound expertise in decorative and functional surface finishing, Lidar and night vision sensors and optics, laser beam measurement, and characterization products, we enable our customers to drive next-generation mobility. Find out more about our Automotive Solutions across our brands: Ophir, Newport, Spectra-Physics, Atotech, and MKS Vacuum.

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

SPIE Photonics West
January 30 – February 1, 2024
San Francisco, CA

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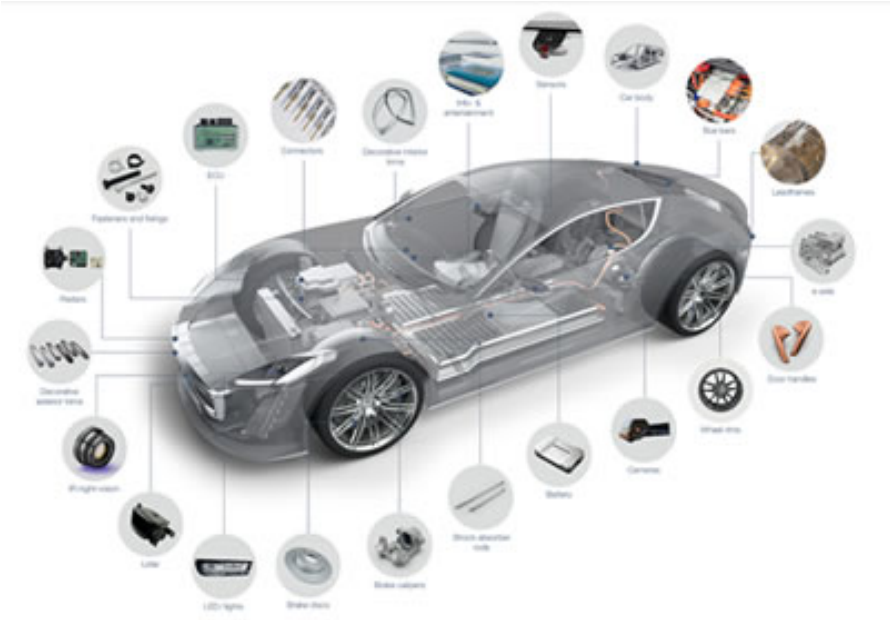

AquaShieldIR™ Hydrophobic Coating for IR Maritime and Naval Security &Surveillance
Traditional coatings often struggle to withstand extreme conditions, such as wet, humid, and salty environments. This can compromise the durability and performance of infrared (IR) imaging technology. To overcome this obstacle, Ophir Optics has developed AquaShieldIR™, an advanced hydrophobic coating specifically designed to provide long-lasting protection and enhance the capabilities of IR imaging lenses in maritime environments. AquaShieldIR.

Research News

Acousto-Optic Modulation of Gigawatt-Scale Laser Pulses
Modern photonics can involve wavelengths or high optical powers that restrict control due to absorption, light-induced damage, or optical nonlinearity in solid media. We circumvent these constraints by efficiently deflecting ultrashort laser pulses using ultrasound waves in ambient air, without the use of transmissive solid media. The beam-quality parameter M^2 is determined using the Ophir M^2-200s beam profiler. Modulation of Gigawatt Laser Pulses.

Stimulations in Auditory Brainstem Response Test in Induced Tinnitus
Tinnitus, or the phantom perception of sound, is a common and annoying symptom whose neural basis is still unclear. We assess use of the auditory brainstem response (ABR) test by comparing acoustic ABR (aABR) and optoacoustic ABR (oABR) to determine the changes caused by sodium salicylate (SS)-induced tinnitus. The Ophir Vega laser power meter was used to check the exact output power after coupling the fiber to the device. Tinnitus Testing.

Photonics Calculators

Power Density Calculator
Use this calculator to determine the power density and/or fluence (energy density) of your laser beam. Power Density Calculator.

Laser Focal Spot Size Calculator

Use this calculator to get the size and location of your Gaussian laser beam waist at focus, as well as the Rayleigh range. Laser Focal Spot Size Calculator.

DRI Range Calculator
Use this optics calculator to easily estimate the maximum range that an object can be detected, recognized, or identified. Upon completion of the calculation, using the final values, you will be able to search for the appropriate IR lens to meet your requirements. Detection, Recognition & Identification (DRI) Range Calculator.

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 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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