ePulse: Laser Measurement News

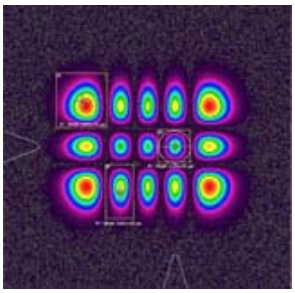
October 2018 - Best of Issue

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

Evaluating a Multimodal Beam

By Mark Szorik, Sr. Sales Territory Manager, Ophir Products



Initially, lasers generated a fundamental Gaussian mode - TEM00 or a close derivation of this. Shortly thereafter, researchers devised ways of generating and using more complex higher-order multimode formats, such as a TEM03 or TEM33. But because lasers are dynamic and in a constant state of flux, variations in modal distribution can and do occur. That raises the question, how can real-time qualitative and/or quantitative data about a beam or light source be collected, single or multimode? Measuring Multimodal Beams.

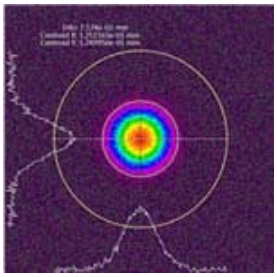
Laser Measurement: What You Need to Know for Accuracy & Reliability

By Dr. Ephraim Greenfield, CTO, Ophir Photonics

New wavelengths, higher powers/energies, and new applications...there is no doubt that the laser industry is advancing steadily. That being said, there are still three basic ways to measure laser power and energy: thermopile detectors, photodiode detectors, and pyroelectric detectors. The choice will depend on a number of factors. Here's what you need to know for accurate and reliable measurement. Measuring Laser Power and Energy.

Data Smoothing Laser Beam Profiles

By Kevin Kirkham, Senior Manager, Product Development, Ophir (U.S.)



The dynamic parts of a laser beam profile are often caused by distortions or noise from camera sources or optical distortions from dirty filters or beam splitters. These dynamics can be removed with low pass filters. BeamGage, Ophir's next-generation laser beam analysis software, contains a processing feature located on the Capture tab called CONVOLUTION. Convolution Matrix or Kernel image processing can be used as a smoothing or blurring feature to remove the fast changes or dynamics from the beam profile. Here's how. Data Smoothing.

Videos of the Month

Focal Spot Analyzer

How the Ophir Focal Spot Analyzer helps you measure the exact location of your laser's focused spot. Video: Focal Spot Analyzer.

How a Laser Works

A fun approach to the basics of how lasers work, starting with the terminology. Video: How a Laser Works.

Laser Puzzle

Try your hand at this month's Laser Puzzle. All submissions will receive an 8GB USB pen drive. The grand prize winner will receive a 16GB iPad. E-mail answers to sales@us.ophiropt.com. Need a hint? E-mail john.mceldowney@us.ophiropt.com

Here's the answer to last issue's puzzle. Congratulations to the winner of last issue's puzzle - **Aleksandr Ryasnyanskiy, Laser Group Manager, OptiGrate Corp**. "I manage the laser development efforts at OptiGrate. We use Ophir power meters and beam profilers for testing and optimization of our holographic optical element products." - *Aleksandr Ryasnyanskiy*.

Social Media: Blog

The Trick to Measure Your Pulsed Laser Peak Power

If you're involved with pulsed lasers for research, system design, process control, final test, or field service, you need to accurately measure your laser's power. Here are the calculations you need to know. Peak Power.

Beam Profiling in the SWIR Range: What You Need to Know
By Dick Rieley, Sales Manager, Mid-Atlantic Region, Ophir (U.S.)
When applications call for beam diagnostics in the SWIR spectral range, specifically the 1.5µm region, there are two practical options available: a phosphor coated CCD camera or an InGaAs array camera. Here is where it may seem that the decision is easily reached, but it is the wrong solution. Beam Profiling.

Applications

High-Power Lasers Energize Materials Processing
Laser-based industrial applications from cutting and welding to additive manufacturing are shaped by the laser technology they are based on. As a result, knowledge of the latest high-power (and, for pulsed, high-average-power) laser technologies is key to both creating and using the newest generation of laser-based processing equipment. This *Laser Focus World* tech digest highlights three of these leading-edge technological approaches. High-Power Lasers.

SLM Troubleshooting Made Easy with BeamWatch® AM
By Christian Dini, Director Global Business Development, Ophir

When we developed BeamWatch AM, we not only drew diagrams and thought about great features, we also talked to experienced manufacturers of selective laser melting (SLM) machines about issues they needed to address and parameters they were interested in. Bit by bit, we created a measuring device that is compact, fast, and delivers a precise view of the laser beam. During the final stage of development, the German Fraunhofer Research Institution for Additive Manufacturing Technologies (IAPT), one of several beta sites, conducted a series of tests using BeamWatch AM with five different SLM machines. They were able to uncover detailed insights based on precise measurements and learn more about the everyday use of the measurement system. Selective Laser Melting.

The Challenge of Measuring Rubber
By Moshe Danziger, Application Engineer, Optimet
Unlike most industrial materials, rubber surfaces might be elastic. If you put a little pressure on it, it will curve, even if it's not visible to the naked eye. The best way to measure soft rubber is using a non-contact laser sensor, as touching the probe may change both the measurement results and accuracy. Measuring Rubber.

Can You Measure Beam Quality (M2) in Real Time?
By Ilan Haber, Director R&D and Marketing, Ophir

Since beam quality (M-Squared) can be calculated only by taking several measurements along the laser beam caustic, you will typically need to move either the camera or laser source along its axis to get snapshots at different locations. Here are two approaches that don't move the camera or the laser. Beam Quality.

What's New

LP2 Power/Energy Sensor with Very High Damage Threshold for High Power Density and Long Pulse Lasers
The L50(150)A-LP2-35 is a compact, thermal measurement sensor for use with high power density and long pulse lasers. It features an LP2 coating that provides the highest damage threshold in the industry, 33kW/cm^2 at full CW power of 150W power. The coating also reduces reflection, absorbing 95% at most wavelengths, and is spectrally flat at

Catalogs: Power Meters & Beam Profiling

Download the 2018 Ophir Laser Measurement Catalogs today. Tutorials and product specifications for Power Meters and Beam Profiling. Beam Profiling Magalog includes application notes, technology articles, and reference algorithms.

Trade Shows

Materials IT
October 22-26, 2018
Bologna, Italy

Aviation Forum
November 5-7, 2018
Hamburg, Germany

FABTECH
November 6-8, 2018
Atlanta, GA

Precisiebeurs
November 14-15, 2018
Veldhoven, Netherlands

METALEX
November 21-24, 2018
Bangkok, Thailand

Lasertagung Jena
November 22-23, 2018
Jena, Germany

LAF Laser Anwenderforum
November 28-29, 2018
Bremen, Germany

Fast Ship Program

Ophir's Fast Ship program provides one-day shipment of the most popular power/energy, beam profiling, and M2 laser measurement equipment across the U.S.

How to Get a 15% Discount

If you're an end user of our laser equipment, we'd like to know more about how you use it. Provide us with 500 words and a few images. In exchange, we will give you a 15% discount on your Ophir laser measurement equipment. Here's a sample application article to get you started. We'll showcase your application in our ePulse newsletter and you'll get recognition by the industry for your commitment to providing high quality laser services. And you'll get the discount! E-mail kevin.kirkham@us.ophiropt.com

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±1% from 0.25µm to 2.2µm. LP2 Sensor.

FluxGage™ Measurement System for Large-Size Street and Industrial LED Luminaires

The FluxGage FG1500 is a compact measurement system for LED luminaires. It features an aperture size of 144 x 64cm, allowing for photometric measurement of large-size street and industrial luminaires, LED flat panels, and troffer lights. Photometric measurements include total luminous flux (up to 80,000 lm), spectrum and color parameters (CCT, CRI, TM-30), and flicker. FluxGage.

NanoScan™ Scanning Slit Laser Beam Profilers for Sub-Micron Measurement of Tunable Lasers and Mid IR Lasers

The NanoScan 2s is a NIST-calibrated, high power, scanning slit laser beam profiler. It instantly measures beam position and size with submicron precision for CW and kilohertz pulsed lasers. A choice of silicon, germanium, or pyroelectric detectors allow profiling lasers of any wavelength, from UV to far infrared, to 100µm and beyond. NanoScan.

DuralensExtra™ Low Absorption ZnSe Lens for High-Power CO_2 Lasers.

The DuralensExtra is a low absorption ZnSe lens for high-power CO_2 lasers. A high performance ZnSe coating gives the lens a longer life expectancy, as well as reduced thermal lensing, resulting in improved focus accuracy and stability. An impressive absorption percentage of <0.16%, compared to <0.22% for the original Duralens, allows for maximum transmittance and minimum distortion. DuralensExtra.

Technical Tips

The Vocabulary of Laser Beam Measurement

A comprehensive list of laser measurement terms and their definitions. Read the Tech Tip.

Thickness Measurement Using Conoscopic Holography Non-Contact Laser Sensors

By Schmulik Barzilay, International Sales Manager, Optimet

Non-contact laser sensors can provide a variety of parameters to measure and characterize surface features such as flatness, roughness, and displacement. One dominant parameter end users want is to measure is the thickness of metal, plastic, wood, and glass. Here's how. Read the Tech Tip.

Pulsed Power Measurements

Ophir has a number of sensors which utilize pulsed power measurements. This mode enables quick and easy measurements of high power lasers with small air cooled sensors. Sensors include several thermal power sensors, including the advanced Helios for industrial environments. Find out which is right for your application. Read the Tech Tip.

FAQs

Power Meters

How do I use the analog output of a meter to get a reading of power? And how accurate is it? Read the FAQ.

How can I clean the 10K-W, 15K-W, or 30K-W sensor? Read the FAQ.

Beam Profiling

How do I clean dust specs off of the windowless CCD camera sensor? Read the FAQ.

The Ophir Laser Measurement Group

Web

www.ophiropt.com/photonics

How do I profile a laser with a beam size that is too big to fit onto the camera CCD detector? Read the FAQ.

About Ophir

Ophir is a brand within the MKS Instruments Light & Motion 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, and OEM and replacement high-quality optics and sub-assemblies for CO2 and high-power fiber laser material processing applications. Dedicated to continuous innovation in laser measurement, the product portfolio includes the **R&D 100** award-winning **BeamTrack** power/position/size meters and Spiricon **Ultracal™**, the baseline correction algorithm that helped establish the ISO 11146-3 standard for beam measurement accuracy. The company is **ISO/IEC 17025:2005** accredited for calibration of laser measurement instruments. The company's modular, customizable solutions serve semiconductor, industrial, life and health sciences, research, and defense industries throughout the world. An ISO 9001:2008 Registered Company.

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