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ePulse: Laser Measurement News

November 2015

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.

Business Perspective

5 Situations Where Laser Performance Measurement is Necessary

By John McCauley, Product Specialist, Ophir-Spiricon

Even with noteworthy advances in laser source and laser system technologies, the second law of thermodynamics can't be avoided. Laser systems are comprised of physical matter, so their components will always seek a way to revert to a natural state...aka degradation. This means that over time, these changes must be measured so the process can be controlled and more efficiently managed. But how often should the data be collected? What measurements should be tracked? When this data is collected, what should be done with it? Let's take a look... Laser Performance.

Features

A Discussion of Laser Beam Profiling and the Subject of Accuracy

How can I be certain that my beam profiler is measuring accurately? Is there a standard calibration methodology? There actually is no calibration standard from which one can verify their camera-based beam profiling measurement accuracy. Spiricon has done the next best thing to provide customer confidence in reliable and consistent results from its camera-based profilers. The issue can be broken down into two major areas: (1) the input (camera) and (2) the output (from software algorithms). Laser Beam Profiling Accuracy.

Research Paper: Image of Laser From Rayleigh Scattering Directly Correlated to Beam Waist Measurements of High-Power Lasers

By Jeffrey Guttman and John McCauley, Ophir-Spiricon

Focused CW lasers in only the 1 W range and pulsed lasers in the 1 J range can damage scanning apertures, and beams in the kW range can damage beam samplers. A new approach to beam measurement using the signal of the laser produced from Rayleigh Scattering puts to rest concerns about equipment damage and allows instant beam characteristic measurements. Rayleigh Scattering.

Measuring Pulsed Lasers with the NanoScan 2s

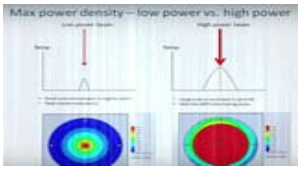
By Kevin Kirkham, NW Regional Sales Manager, Ophir-Spiricon

The NanoScan 2s is the latest scanning slit sensor-based beam profiling system from Ophir-Spiricon. It can profile pulsed laser beams with

Videos of the Month

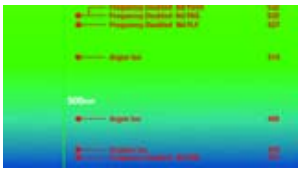
Does Damage Threshold Depend on Power Level?

Does power density damage threshold really change with power? Shouldn't it remain the same throughout the whole power range? In this video you'll learn why the specified damage threshold does indeed depend on the power level, not just on power density. Video: Power Density.



Measuring the Full Spectrum

For every wavelength of laser along the electromagnetic spectrum, Ophir-Spiricon can measure the output. This video briefly introduces the equipment used in the different regions of the spectrum to measure and profile lasers. Video: Full Spectrum.



Laser Puzzle

Try your hand at this month's Laser Puzzle. All entries will receive a 1000mAh battery recharger for your mobile devices and the new Ophir Laser Measurement Poster. 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 are the answers to the last issue's puzzle. The winner of last issue's puzzle was **Tom Corboline, Sr. Laser Engineer, IPG Photonics.** "We use Ophir beam profilers to characterize our lasers. In addition, we measure M^2 using both 1780 ModeScan and M^2-200S and use a number Ophir power meters to verify the laser output power."

repetition rates of 10 kHz and above. To enable the measurement of these pulsed lasers, the profiler incorporates a "peak connect" algorithm. Pulsed Lasers.

New Online Calibration Portal
By Kristen Winterton, Calibration Technician, Ophir-Spiricon LLC
Ophir-Spiricon is proud to announce the release of our new online Calibration Portal. This portal will allow you to track the status of open RMAs and maintain calibration information for all equipment. Calibration Portal.

Webinars

Basic Principles of Power/Energy Measurements
Join product manager Mark Slutzki for our on-demand tutorial webinar: *Basic Principles of Laser Power and Energy Measurement*. Learn how laser power and energy measurements work and what type of equipment you should use to measure each laser parameter, including general power sensors, energy sensors, low power sensors, radiometers, and integrating spheres. Power/Energy Measurements.

Guide to Laser Beam Characterization
Measurement and analysis of beam characteristics is essential for today's laser-based applications. In general, beam characterization can include measurement of the laser energy/power, spectral and temporal properties, and/or beam profile. Join us for this *Laser Focus World* webcast on **December 9, 2015** to discuss the technology behind beam-characterization instruments, as well as useful measurement techniques. Beam Characterization.

Technical Tips

Power/Energy Meters

The Fine Print on Sensor Data Sheets
Each Ophir power/energy sensor is provided with a functional data sheet with helpful information about its particular operational parameters and specs. Also included is fine print with helpful notes about getting the highest accuracy and optimizing the sensor's performance. Read the Tech Tip.

Measuring an Unstable Laser Can Be Frustrating
To handle a beam that has unstable power (fluctuation and drift), you first need to observe the behavior of the readings. Here's how. Read the Tech Tip.

Beam Profiling

Multiple Instances of BeamGage®
BeamGage has the ability to run multiple instances while connected to the same camera source, which can add benefits such as simultaneous mutually exclusive results. Here's how. Read the Tech Tip.

FAQs

Beam Profiling
Are M^2-200s lenses interchangeable from one unit to another? Read the FAQ.

Can any BeamGage camera be used with an M^2-200s system? Read the FAQ.

Power/Energy Meters
Does the sensor accuracy, such as ±3%, apply linearly for the full range of the sensor? Read the FAQ.

Why is the Quasar not working with the latest StarLab? Read the FAQ.

From the Blog

How to Measure Low Power Lasers (pW to W)
There are a few different ways to measure low laser powers, but the most common is the photodiode. Photodiodes translate light energy into electricity (current), which can be measured by a current sensor. Low Power Lasers.

Must You Measure Industrial Laser Performance?
Laser manufacturers test and measure their lasers during development to make sure you, the laser end user, get the highest quality laser system. With this in mind, do you really have to measure your laser system? Industrial Laser Performance.

2015 Catalogs: Power Meters & Beam Profiling

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

Trade Shows

SME/FMA's FabTech
November 9-12, 2015
Chicago, IL
Booth #C1637

SPIE Photonics West
February 16-18, 2016
San Francisco, CA
Booth 1400

MD&M West
February 9-11, 2016
Anaheim, CA
Booth 472

Fast Ship Program

Ophir-Spiricon's Fast Ship program provides one-day shipment of the most popular power/energy, beam profiling, and M^2 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-Spiricon laser measurement equipment. Here's a sample application article to get you

Can a pyroelectric sensor of the "BF" type work at 157nm? Read the FAQ.

Can my PD300 be placed inside a chamber in which the laser system is going through temperature cycling (from -18˚C to +49˚C)? Read the FAQ.

What's New

Knowledge Center
Try out our new Knowledge Center. It's now easier than ever to find the right data sheet, manual, or answer to your question. Search for relevant FAQs, videos, and more. Filter results by laser type, Ophir product, or content type. Give it a try; you'll be amazed at how much technical content is at your fingertips. Knowledge Center.

NanoScan™ 2s Scanning Slit Laser Beam Profiler for Sub-Micron Measurement of Beam Position and Size

Now available in a more compact size, NanoScan 2s is a NIST-calibrated profiler that instantly measures beam position and size with sub-micron precision for CW and kilohertz pulsed lasers. The profiler offers silicon, germanium, or pyroelectric detectors; this allows profiling lasers of any wavelength, from UV to far infrared, to 100µm and beyond. New software, available in Standard and Professional versions, allows users to custom configure the display interface; results can be shown on a single, easy-to-read screen or across multiple screens. NanoScan 2s.

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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About Ophir-Spiricon, LLC

With over 35 years of experience, Ophir Photonics, a Newport Corporation company, provides a complete line of instrumentation including power and energy meters, beam profilers, spectrum analyzers, and goniometric radiometers. Dedicated to continuous innovation in laser measurement, the company holds a number of patents, including the R&D 100 award-winning **BeamTrack** power/position/size meters and Spiricon's **Ultracal™**, the baseline correction algorithm that helped establish the ISO 11146-3 standard for beam measurement accuracy. The Photon family of products includes **NanoScan** scanning-slit technology, which is capable of measuring beam size and position to sub-micron resolution. The company's modular, customizable solutions serve manufacturing, medical, military, and research industries throughout the world.

An ISO 9001:2008 Registered Company. ISO/IEC 17025:2005 accredited for calibration of laser measurement instruments.

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