

ePulse: Laser Measurement News

The true measurement of laser performance



ePulse: Laser Measurement News September 2014



Welcome to this special "best of" edition of **ePulse: Laser Measurement News**. Please forward to interested colleagues or have them [subscribe](#).



Tutorials

Beam Width Measurement Accuracy

CCD cameras are commonly used for a variety of imaging applications, as well as in optical instrumentation applications. These cameras have many excellent characteristics for both scene imaging and laser beam analysis. However, CCD cameras have two characteristics that limit their potential performance. Read the details at [Measurement Accuracy](#).

Modifying Laser Beams: No Way Around It, So Here's How

Applications of laser technology are growing in leaps and bounds, from industrial material processing to medical therapy to communications systems. Before using the laser, it is usually necessary to modify the laser beam to achieve the desired results. This paper discusses using beam measurement tools, aligning optical systems, collimation and focusing, handling high power lasers, and attenuation. [Laser Beam Profiling](#).

Feature

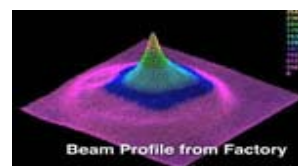
Deming Must Be Wrong

Deming said, "If you can't measure it, you can't control it." There are all kinds of lasers being used in manufacturing of high precision, high reliability parts that need consistency. But there's a disconnect. The first thing you learn about a laser beam is that its output is like a light bulb, constantly changing. Then why is it that manufacturers mistakenly assume they don't need to measure their beam? [Deming](#).

Videos of the Month

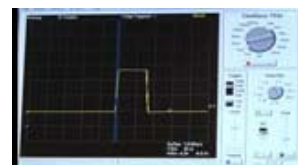
Choosing a Laser Beam Profiling System

Make sure the laser beam quality you expect is the one that is delivered. See how beam profiling can help you get the most performance out of your laser. [Video: Laser Beam Profiling](#).



How to See an Analog Representation of Laser Power/Energy on a Scope

Sometimes you need to see an analog representation of your laser power/energy on a scope, in parallel to measuring it with a meter. This video will show you how. [Video: Analog Scope](#).



Measuring Laser Focus Spot Size in an Industrial Medical Device Application

This step-by-step tutorial shows how to set up a camera-based beam profiling system on an industrial single-pulse laser welding system. Demonstrates how to simultaneously analyze a laser's focused spot, measure a laser's energy per pulse, and measure temporal pulse shape. [Video: Laser Focus Spot Size](#).



Laser Puzzle

[Try your hand at this month's Laser Puzzle](#). All entries will receive a 4GB pen drive and the new Ophir Laser Measurement Poster. The grand prize winner will receive a 16GB iPad. E-mail

Applications

LIDAR Guns, Accuracy, & Speeding Tickets

Anyone who has driven a vehicle has encountered a Light Detection and Ranging (LIDAR) system in action...and probably knows how much it can cost in terms of speeding fines. Behind the scenes, the LIDAR device sends out a 130 μ W 904 nm beam produced by three LEDs. This app note takes a look at how radar gun performance is tested. [LIDAR Guns & Speeding](#).

Process Validation of Laser Welded Parts in Biomedical Apps

"What does beam profiling do for me?" "How can I use the data I get from a beam profile?" We recently met with a customer in the biomedical industry to discuss beam profiling as it applies to their laser welding processes. The challenge began with why weren't two identical laser systems producing the same number of acceptable parts. [Find out how beam profiling provided the answer](#).

Technical Tips

Beam Profiling

What is Convolution, or How Small a Beam Can I Measure?

A CCD profiler can measure a beam of approximately 40-50 μ m. A scanning slit profiler is known for being able to measure smaller beams...but just how small? [Read the Tech Tip](#).

Lens Calculator for ModeScan 1780

To get the best results from the ModeScan 1780, it is important to understand which lens to use and where to locate it for particular parameters of the laser under test. The ModeScan 1780 Calculator is a spreadsheet that computes laser propagation parameters in the laser space and the test space. [Read the Tech Tip](#).

Power/Energy Meters

Measuring Beams Coming Out of a Fiber

When you need to measure a beam coming out of a fiber, there are some parameters that might have a somewhat different meaning than they do when referring to "regular" beam measurements. [Read the Tech Tip](#).

Android App for Laser Power Measurement

The Quasar Reader turns your Android smartphone into a laser power meter. [Read the Tech Tip](#).

Shortcut for Calculating Power Density of a Laser Beam

Calculating a laser's power density is often required to determine whether a beam will damage an optic or sensor. Here's a shortcut. [Read the Tech Tip](#).

FAQs

Power/Energy Meters

How is the power meter sensor calibrated for wavelengths other than the specific wavelengths used for calibration? [Read the FAQ](#).

For water-cooled sensors, the specifications say that the temperature of the cooling water should be in the range of 18-30°C. Tap water is usually colder in our country. Is it OK to use water that is colder than the specified range? [Read the FAQ](#).

Beam Profiling

My Pyrocam III camera has laser burn spots on the detector. Can the detector be replaced or do I need to replace the whole camera? [Read the FAQ](#).

How can I be certain that my beam profiler is measuring accurately? Is there a standard calibration methodology? [Read the FAQ](#).

answers to sales@us.ophiropt.com. Need a hint? E-mail kevin.kirkham@us.ophiropt.com

Here are the [answers to the last issue's puzzle](#). The winner of last issue's puzzle was **Steven Hathaway, Specialist and LSO, Fuegetechnik Laser**. "We have (11) Class 4 Lasers which we use for Aluminum welding of Auto parts. We use Robotic carried weld heads inside a Class 1 enclosure to perform the welding. As LSO, I use my Ophir meter to measure any radiation leaks I see to determine if there are any dangerous levels. It's a great tool." -- Steven Hathaway

From the Blog

How to Measure Pulsed Laser Beams with a Photodiode Sensor

Each type of laser power sensor has its own area of relevance. The informed user can make the most of a sensor by knowing when and how to use it. Photodiodes, for instance, are excellent for lower power lasers. [Pulsed Laser Beams](#).

2014 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

[Lasers for Manufacturing Event](#)
September 23-24, 2014
Schaumburg, IL
Booth 3015

[LASER World of PHOTONICS INDIA 2014](#)
October 8-10, 2014
Mumbai, India

[2014 IEEE Photonics Conference \(IPC\)](#)
October 12-16, 2014
San Diego, CA

[TIB: Bucharest International Technical Fair](#)
October 15-18, 2014
Bucharest, Romania

[MD&M Minneapolis](#)
October 29-30, 2014
Minneapolis, MN
Booth 1151

[FABTECH 2014](#)

What's New

Beam Profiling Camera for 2D/3D Viewing of Long Wavelengths

Pyrocam™ IVs is the next generation of the popular Pyrocam III pyroelectric laser beam profiling camera. It features a more sensitive, 160 x 160 pixel image array that can profile beams up to ½-inch (12.8 mm) without the need for reduction optics. Measures both pulsed and CW (continuous wave) lasers, from 13 to 355 nm and 1.06 to >3000 µm. An integral focal plane chopper is included for CW beams and thermal imaging. [Pyrocam IVs](#).



USB Comms Added to Low Cost, Handheld Laser Power/Energy Meter

StarLite, the low cost, handheld laser power/energy meter, features a new USB option that adds PC communication and data processing capabilities. It also allows the meter to display all measurements on the StarLab 3.0 laser measurement software. StarLite displays a variety of beam measurements, including power, single shot energy, energy and frequency of high repetition rate lasers, and beam position and size. A large, 320x240 pixel TFT display with 16mm digits provides increased legibility, and monitors power from pW to many kW or energy from pJ to hundreds of Joules. [StarLite](#).

Laser Beam Splitters for Large Beams to 1-Inch, Powers to 500W

The LBS-400 Beam Splitters control and adjust beam output power that reaches the beam profiling camera. The new samplers are the largest, dual-wedge attenuators on the market. They measure UV, NIR, or IR wavelength beams with diameters up to 1 inch (25.4mm) and power levels from 10mW to 500W. For use with the Pyrocam™ pyroelectric beam profiling cameras. [LBS-400](#).

November 11-13, 2014
Atlanta, GA

Fast Ship Program

Ophir-Spiricon'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-Spiricon 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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About Ophir-Spiricon, LLC

With over 30 years of experience, Ophir Photonics, a Newport Corporation brand, 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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