ePulse: Laser Measurement News

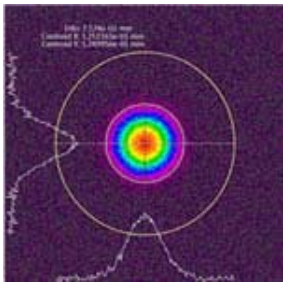
November 2017

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

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.

Achieving Standardized Measurements with BeamWatch AM

By David K. Moser, Optical Engineer, and Jed Simmons, Physicist, Ophir (U.S.)

BeamWatch AM is the newest member of Ophir's family of beam monitoring systems, designed specifically for use in the additive manufacturing industry to provide non-interfering real-time beam measurement at the location of the working plane. Using Rayleigh-scattering measurement technology, BeamWatch AM can be used to analyze the properties of a laser beam without having the beam incident on the sensor and can provide ISO-compliant measurements. BeamWatch AM.

Research News

Robust, High Brightness, Degenerate Entangled Photon Source

Reporting on the development of a compact, simple, and robust high brightness entangled photon source at room temperature based on a 30-mm-long periodically-poled potassium titanyl phosphate crystal. To date, this source generated the highest number of degenerate photons using a continuous-wave laser pumped bulk crystal and detected using multimode fiber. Tested using a Spiricon SP620U CCD camera. *Nature*: Entangled Photon Source.

Videos of the Month

Improving Production Quality

For measuring high power lasers in industrial settings, meet Ophir's Helios. Designed with factory automation in mind, water-free, it has a robust, industrial design for harsh environments, and its communication interfaces make it easy to integrate into factory networks. Video: Helios.

Calibration Portal

Our new Calibration Portal provides information about the types of laser measurement equipment processed at Ophir-Spiricon, current status of calibration RMAs, and includes links to request RMAs and calibration certificates. Video: Calibration Portal.

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. The winner of last issue's puzzle is **Allan Edwards, BAE Systems**. "In my current role, we use the PE25-C pyroelectric laser sensor to measure the output of a 1.5 um Q switch laser. I also have an interest in lasers used for cosmetic treatments (inc. tattoo removal). Generally, as an optical physicist I need to keep in touch with my domain suppliers, so I welcome the ePulse newsletter." - Allan Edwards, BAE Systems, Surrey, UK.

Wavelength-Tunable Passively Mode-Locked Mid-Infrared Er^{3+}-Doped ZBLAN Fiber Laser
A passively mode-locked Er^{3+}-doped ZBLAN fiber laser around 3µm with a wide wavelength tuning range is demonstrated. The laser cavity was comprised of a semiconductor saturable absorber mirror and a blazed grating to provide a wavelength tunable feedback. The central wavelength of the mode-locked fiber laser can be continuously tuned from 2710 to 2820nm. ISO-standard caustic measurements were performed to measure the laser output beam quality factor M^2 with the Ophir PYROCAM III, mid-infrared camera. *Nature*: Fiber Laser.

Webinar

Beam Quality for High Power Lasers
Measurement and analysis of beam characteristics is essential for most laser-based applications, and high-power applications are not an exception. Beam-profile analysis and other beam measurements enable understanding of the beam's spatial characteristics such as size, shape, position, mode structure, and propagation properties. This *Laser Focus World* webcast describes the principles and best practices for high-power laser beam measurement. **Webinar: November 14, 2017, 1pm ET, 6pm GMT.** Beam Quality.

Water Cooled Laser Sensors: Do's and Don'ts
High-power laser sensors are often cooled by flowing water – likely the same water that is also cooling the laser. However, there are some issues – water type and flow conditions, for example - that can cause incorrect readings and even sensor damage if you don't get them quite right. Understanding these can keep your work running smoothly and correctly. We will be running two sessions to accommodate different time zones. **Webinar: November 15, 2017.** Water Cooled Laser Sensors.

What's New

Finding the Center of the NanoScan
Finding the mechanical location of your laser beam can be important in some applications. Using a NanoScan scanning slit beam profiler you can find a mechanical location of the center of your beam by following these steps. NanoScan.

Community Service at Providence Canyon
This year Ophir-Spiricon participated in a community service project in Providence Canyon, Utah. The canyon needs to be cleaned before the winter season, and the volunteers' efforts provided help to maintain this beautiful piece of land for families and nature enthusiasts to enjoy. Community Service.

Semiconductor Devices and Process Technology Handbook
The Semiconductor Devices and Process Technology handbook from MKS Instruments presents the fundamental device physics, materials, and fabrication processes used to manufacture semiconductors. Also details the technologies, instruments, and equipment that are used to monitor, control, and automate the fabrication processes. Get your free copy today. MKS Instruments Handbook.

FAQs

Social Media

Blog: Can a Simple Sensor Replace a Beam Profiler?
Do you need to profile your laser beam but are worried about the cost of a beam profiler? Or maybe you think it will be too complex for your technicians? Maybe you can use the BeamTrack laser power sensor as an alternative to a full laser beam profiler. Well, sort of. It depends on what you need to measure. Beam Measurements.

Catalogs: Power Meters & Beam Profiling

Download the new 2017 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

MD&M
November 8-9, 2017
Minneapolis, MN

Precisiebeurs
November 15-16, 2017
Veldhoven, Netherlands

Lasertagung Mittweida
November 16-17, 2017
Mittweida, Germany

Anwenderseminar Additive Fertigung
November 23. 2017
Bremen, Germany

Workshop zur Laserbearbeitung von Glasworkstoffen
December 6, 2017
Numberg, Germany

NEPCON Japan
January 17-19, 2018
Tokyo, Japan

Photonics West
January 27 - February 1, 2018
San Francisco, CA

EALA: European Automotive Laser Applications 2018
February 6-7, 2018
Bad Nauheim, Germany

Photonics, World of Lasers and Optics
February 27 - March 2, 2018
Moscow, Russia

Fast Ship Program

Ophir'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.

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

Why doesn't my Ophir USB power meter connect in BeamGage? Read the FAQ.

Can I purchase a new camera for my LBA-PC frame grabber card system? Read the FAQ.

Power Meters
I understand how to choose the right sensor. How do I choose the right meter (display, instrument)? Read the FAQ.

I see Ophir has released some new thermal sensors with an absorber called "LP2." What is that? Read the FAQ.

I just installed StarLab 3.30 and now my Juno is no longer recognized. How do I get it working again? Read the FAQ.

I do not see any measurement with a pyroelectric energy sensor when it is exposed to a CW HeNe laser. Why not? Read the FAQ.

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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About Ophir

MKS Instruments, Inc. is a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor, and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. With over 40 years of experience, the Ophir brand comprises a complete line of instrumentation, including power and energy meters and beam profilers. 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 is **ISO/IEC 17025:2005** accredited for calibration of laser measurement instruments. The company's modular, customizable solutions serve manufacturing, medical, military, and research industries throughout the world. An ISO 9001:2008 Registered Company.

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