



UPDATES

Bi-monthly updates on the latest in Photonics & Lasers

This Issue

BEIJING OFFICE Pg 1

CORPORATE NEWS Pg 2

Newport Motion Control Training 09
New Partner - T-Ray Science Inc

WHAT'S ON Pg 3

COLA 2009
ILOPE 2009

QUICK BYTES Pg 4

sCMOS - Low Light Imaging Camera

PRODUCT SHOWCASE Pg 5

Hinds' Exicor Birefringence Measurement Systems
Linos' Light Source & Fiber Illumination Systems

APPLICATION HIGHLIGHTS Pg 7

Lasers in Photodynamic Therapy for Cancer Treatment

PRODUCT INDEX

www.zugophotonics.com

enquiry@zugophotonics.com

"Success is the sum of small efforts, repeated day in and day out."

Beijing Office

Expanding Territory

Zugo Photonics is proud to announce the opening of its **8th** sales office in Asia. The new office is located in **Beijing**, our third China office following Shanghai and Shenzhen offices respectively.

With a nominal GDP of USD 150 billion and a year-on-year growth of 9 percent, Beijing stands at 64 in the world's richest cities ranking. Being the political and cultural centre of China, Beijing is also the home to 26 Fortune 500 companies, third most after Tokyo and Paris.



Courtesy of www.mapsofworld.com

Following the outbreak of the global financial crisis in 2009, the Chinese government took timely and active measures to adjust its macro-economic policies and carried out proactive fiscal and moderately easy monetary policies to spur domestic consumption. With its current economic development, China looks poised to alleviate itself from the crisis and lead the global economy towards recovery.

The strategic expansion is in line with Zugo's vision as the premier lasers and photonics provider in Asia. The strong foundation laid by the Zugo teams in Shanghai and Shenzhen has nestled the organic growth of the company, and we will continue to expand our sales and services team to cater to the increasing demand for Zugo's products in the China market.

Newport Motion Control Training 2009



A Motion Control training was conducted by Newport's Senior Product Manager for the Motion Products, Mr Beda Espinoza, in the Singapore office from the 28th of September to 2nd October 2009.

The week long training had seen two batches of trainees through a series of motion control fundamentals, motion control mechanics, systems architecture etc, and hands-on sessions, which allowed them to have a better understanding of the workings of the motion control products as well as apply them to the different models that Newport Corporation provides.

The focus of the training was on reviewing the capabilities and functionalities of the products and the hands-on sessions had helped the trainees to familiarize themselves with the products as they were required to complete the specific tasks at each station.

The enlightening sessions had helped the trainees gained better understanding and insights to the products which will serve them well in terms of sales and service support and provide value-add to the customers for their motion control enquires.

Zugo Photonics will continue to work closely with our principals to enhance on our product and technological knowledge to deliver better services to our customers.

New Partner

Zugo Photonics welcomes T-Ray Science Inc into the Zugo family. We will be representating T-Ray Science Inc for its range of Terahertz products in Singapore, Malaysia, Thailand and Vietnam.

The company was incorporated in Ontario in 2006 and it brings together a team of high-level academic researchers, pharmaceutical industry experts, medical device industry experts, and corporate finance professionals to execute a targeted product strategy aimed primarily at the pharmaceutical industry, and medical practitioners who are located both inside and outside of the hospital.

The company's THz technology is also suitable for dental imaging, numerous pharmaceutical applications, wellness industry applications and postal security.

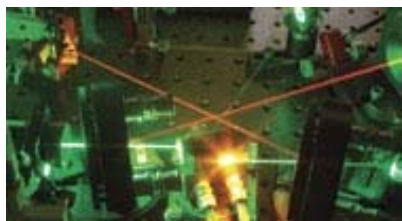
For more information, please visit <http://www.t-rayscience.com>.



T-Ra'sy Dual Mode Terahertz Spectrometer

COLA 2009

10th International Conference on Laser Ablation



COLA is an extremely interdisciplinary conference and the topics cover a wide range of scientific research that often bridges the gap between basic science and applications / technology.

The conference highlights fundamentals of laser - materials interactions and their forefront applications in pulsed laser deposition, nanoscience, analytical methods, materials, and micro/nano processing applications.

Zugo Photonics will be showcasing Nano Kits from Piezosystem Jena and products from T-Ray Science.

Please join us at the exhibition from 22nd to 27th November, Level 3, Furama RiverFront Hotel.

22 - 27 Nov

Some of the topics include:

- ♣ Fundamentals of Laser-Material Interactions
- ♣ Laser Materials Processing
- ♣ Laser Analysis
- ♣ Pulsed Laser Deposition
- ♣ Laser Applications
- ♣ Lasers in Nanoscience - Nanotechnology



China International Exhibition Center, Beijing

Leveraging on the 2008 event, **ILOPE 2009** has superseded its predecessors and emerged as the premier event for the Photonics and Optoelectronic industries in China.

Having expanded both in terms of scope and the number of visitors, ILOPE 2009 is a must-attend for every professional in the industry. It provided an ideal platform for companies, suppliers, buyers, technicians and experts to exchange pointers as well as gather contacts for potential collaborations in the future.

Zugo Photonics is honored to join leading exhibitors from Canada, Germany, Japan, US, UK, Italy, Korea, Hong Kong and Taiwan in the event and we will like to extend our appreciation to all that have visited our booth during the exhibition.

21 - 23 Oct

Congratulations to the Winners of the Nobel Prize in Physics 2009!



Zugo Photonics will like to congratulate Willard S. Boyle and George E. Smith for winning the Nobel Prize in Physics 2009 for the invention of the CCD Sensor.

Boyle and Smith share one half of the 2009 Nobel Prize in Physics for their invention of the charge-coupled device (CCD) used to generate high quality images in electronic form. The first two papers, one theoretical and one experimental paper appeared in the same issue of Bell Systems Technical Journal.

6 Oct

Low Light Imaging Camera

Coming Soon!

Many scientific imaging applications demand multi-megapixel focal plane sensors that can operate with very high sensitivity and wide dynamic range. Furthermore, it is often desirable that these sensors are capable of delivering rapid frame rates in order to capture dynamic events with high temporal resolution. Often there is a strong element of mutual exclusivity in these demands.

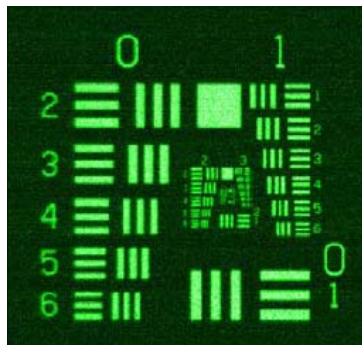
The **Scientific CMOS** (sCMOS) is a breakthrough technology based on next-generation CMOS Image Sensor (CIS) design and fabrication techniques. sCMOS is poised for widespread recognition as a true scientific grade CIS, capable of outperforming most scientific imaging devices on the market today. As a result of an advanced set of performance features that renders it entirely suitable to high fidelity, quantitative scientific measurement.

sCMOS therefore stands alone in its ability to **simultaneously** deliver on many key performance parameters, overcoming the 'trade-offs' that are inherent to current scientific imaging technology standards, and eradicating the performance drawbacks that have traditionally been associated with conventional CMOS imagers.

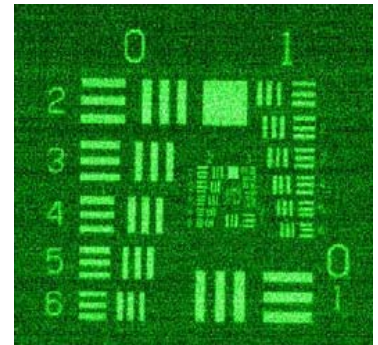
Unlike previous generations of CMOS and CCD-based sensors, sCMOS is uniquely capable of simultaneously offering:

- Extremely low noise
- Rapid frame rates
- Wide dynamic range
- High quantum efficiency (QE)
- High resolution
- Large field of view

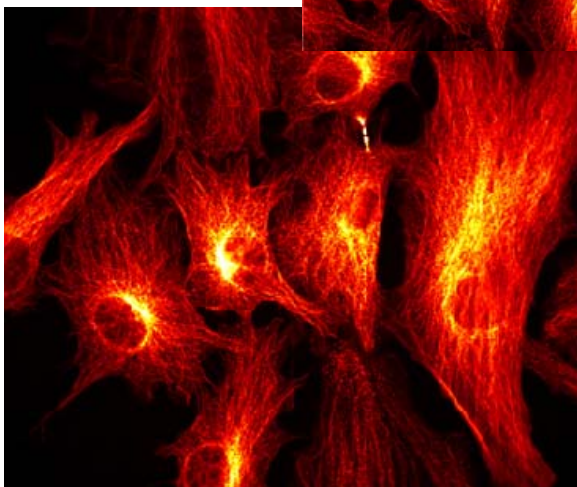
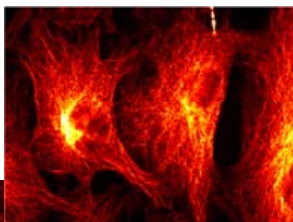
sCMOS – 1.5 e⁻ noise



Interline CCD – 5 e⁻ noise



▶ 1.3 Megapixel Interline 11 frames/sec



Applications of sCMOS include:

- Live cell microscopy
- Particle Imaging Velocimetry (PIV)
- Single molecule detection
- Super resolution microscopy
- TIRF microscopy / waveguides
- Spinning disk confocal microscopy
- Genome sequencing (2nd and 3rd gen)
- FRET
- FRAP
- Lucky astronomy / imaging
- Adaptive optics
- Solar astronomy
- Fluorescence spectroscopy
- Bio- & Chemi - luminescence
- High content screening
- Photovoltaic inspection
- X-ray tomography
- Ophthalmology
- Flow cytometry
- Biochip reading
- Machine vision
- TV / Broadcasting
- Spectral (hyperspectral) imaging
- Laser Induced Breakdown Spectroscopy (LIBS)

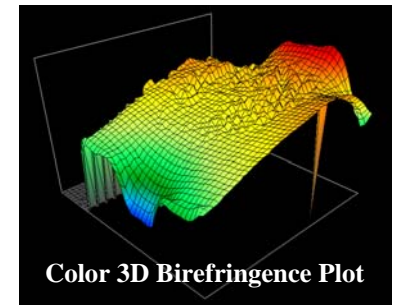
◀ 5.5 Megapixel sCMOS 110 frames/sec

Hinds' Exicor Birefringence Measurement Systems



Exicor Birefringence Measurement technology provides leading edge companies with the world's most technically advanced, production-worthy measurement capability.

Exicor is the metrology standard for measurement of both magnitude and angle of linear birefringence. It features easy-to-integrate data acquisition software, an advanced statistical analysis module, and modular designs for OEMs.



▲ **Hinds' Exicor 150AT Low Level Birefringence Measurement System**

Exicor 150AT

- Used primarily for lower weight optics measuring less than 150mm.
- Unprecedented sensitivity in low-level birefringence measurement
- Simultaneous measurement of birefringence magnitude and angle
- High-speed measurement
- No moving parts in the optical system
- Photoelastic modulator technology
- Excellent repeatability
- PEM Technology used in both ¼ Wave and ½ Wave **Exicor** systems removes the signal intensity dependence of typical measurements systems

Applications include:

- Quality control metrology
- Qualification of semiconductors photolithography components including
 - Calcium fluoride
 - Fused silica
 - Stepper reticles
- Low level birefringence measurement of
 - Flat Panel Display Glass
 - Plastic Film
 - Plate Glass
 - Glass and plastic lenses
 - LCD
 - DVD
 - Laser Crystals

LinOs' Light Source & Fiber Illumination Systems

LED Light Sources HighLED:

- Super bright LED light sources
- Brightness adjustable
- Current stabilized
- Connection of LINOS standard optics with C-Mount
- Compatible to the LINOS Microbench system
- Supply voltage: 12 V / DC (min. 7 V, max. 13 V)
- Plugs for supply voltage: Binder serie 719
- Current stabilization: 150 mA \pm 2%
- Current control: 0-150 mA
- Operating temperature: 0-40 °C
- Mount, diameter: 30 mm
- Mount, total length: 65 mm
- Weight: 60 g



▲ HighLED lightsources in Clamp holder



▲ UV Fiber Light Source

UV Fiber Light Source:

- High quality and long lifetime, suitable for continuous operation
- All-metal, powder-coated metal housing
- Servo brightness control
- Fine Adjustment using at touch pads
- Heat protection filter KG 1
- 230 / 115 V ~, 50 / 60 Hz
- Radio interference suppression N
- Type of electrical protection 1/ tested by the German Association for Technical Safety and Inspection (TÜV)
- CE mark acc. to Council Directive 93/42/EEC, class 1
- Type complies with the following International, European and German Standards

Halogen Fiber Light Source:

- High quality
- Long lifetime
- Suitable for continuous operation
- Mechanically rugged steel construction
- Insulated connector for light guides
- On/off bipolar switch
- Apparatus socket with built-in fine-wire fuses
- Separate power cable, 2 m
- Temperature overload protection
- Line voltage 230 V ~ / 50 Hz or 115 V ~ / 60 Hz for LQ 200, LQ 1100, LQ 1600



▲ Halogen Fiber Light Source

Lasers in Photodynamic Therapy for Cancer Treatment

Photodynamic therapy is slowly gaining foothold in the treatment of cancer cells. Using light of a specific wavelength, the photosensitizer is activated and they produce a form of oxygen that kills nearby cells.

Each photosensitizer is activated by light of a specific wavelength and this wavelength determines how far the light can travel into the body. Thus, doctors use specific photosensitizers and wavelengths of light to treat different areas of the body with PDT.

Photodynamic Therapy's mechanism

In the first step of PDT of cancer treatment, a photosensitizing agent is injected into the bloodstream. The agent is absorbed by cells all over the body but stays in cancer cells longer than it does in normal cells. Approximately 24 to 72 hours after injection, when most of the agent has left normal cells but remains in cancer cells, the tumor is exposed to light. The photosensitizer absorbs the light and is excited from a ground singlet state to an excited singlet state. It then undergoes intersystem crossing to a longer-lived excited triplet state.

When the photosensitizer and an oxygen molecule are in proximity, an energy transfer can take place that allows the photosensitizer to relax to its ground singlet state, and create an excited singlet state oxygen molecule. Singlet oxygen is a very aggressive chemical species and will very rapidly react with any nearby bio-molecules. The specific targets are heavily dependant on the photosensitizer chosen. Ultimately, these destructive reactions will kill cells through apoptosis or necrosis.

In addition to directly killing cancer cells, PDT appears to shrink or destroy tumors in two other ways. The photosensitizer can damage blood vessels in the tumor, thereby preventing the cancer from receiving necessary nutrients. In addition, PDT may activate the immune system to attack the tumor cells.

The light used for PDT can come from a laser or other sources of light. Laser light can be directed through fiber optic cables (thin fibers that transmit light) to deliver light to areas inside the body. For example, a fiber optic cable can be inserted through an endoscope (a thin, lighted tube used to look at tissues inside the body) into the lungs or esophagus to treat cancer in these organs. Other light sources include light-emitting diodes (LEDs), which may be used for surface tumors, such as skin cancer.

PDT is usually performed as an outpatient procedure and may be used with other therapies, such as surgery, radiation, or chemotherapy.



▲ Image of PDT treatment.
(Courtesy of National Institute of General Medical Sciences.)

Advantages over traditional methods

Unlike chemotherapy and radiotherapy, photodynamic therapy has no long term side effects. It is less invasive than surgery and can be repeated many times at the same site if needed. It is also more localized and the specificity of the treatment is achieved in the following ways.

First, light is delivered only to tissues that the doctor wishes to treat. In the absence of light, there is no activation of the photosensitizer and hence, no cell killing.

Secondly, the photosensitizers may be administered in ways that restrict their mobility. Photosensitizers may be chosen which are selectively absorbed at a greater rate by targeted cells. For example, ALA (Aminolevulinic Acid), which is a photosensitizer, can be applied to the area to be treated and it is taken up more rapidly by metabolically active cells. Since malignant cells tend to be growing and dividing much more rapidly than healthy cells, the ALA targets the unhealthy cells.

Some of the drugs developed also have the desirable property of concentrating tumours and other kinds of proliferating tissue relative to the surrounding healthy tissue, which helps in targeting.

PDT can also be much cheaper than the alternative radiotherapy or surgical operation and after care. Post operative recovery is typically hours or days rather than weeks.

Limitations of PDT

A major limitation of PDT is that the light needed to activate most photosensitizers cannot penetrate through more than one third of an inch of tissue using standard laser technology and low powered LED technology. Laser application of PDT is hence limited to the treatment of tumours on or under the skin, or on the lining of some internal organs. It is also less effective in treatment of large tumours and metastasis for the same reason.

To reduce the limitation of light penetration, new high powered LED technology has been tested to provide a depth of 2 inches from surface in a simulated breast tissue. Also, hollow needles have been used by some units to get the light into deeper tissues.

One other potentially adverse effect of PDT is skin photosensitivity caused by some drugs, which means that patients must stay out of bright light for some time following the administration of the drug.

Lasers for PDT



Spectra Physics' Fabry-Perot (FP) Laser Diode Modules

Wavelengths at 635, 639, 658, 660, 690 nm



Point Source iFlex2000 Fiber Coupled Laser

Wavelengths at 640, 660, 670nm



Point Source iFlex2000 Fiber Coupled Laser

Wavelengths at 640, 660, 670nm

UPDATES

Product Index

PHOTONICS

AIST-NT

Microscopy

<http://www.aist-nt.com>

CAPACITEC

Test & Measurement

<http://www.capacitec.com>

FLUIGENT

Microfluidics

<http://www.fluigent.com>

GENTEC-EO

Test & Measurement

<http://www.gentec-eo.com>

LINOS PHOTONICS

Light Source, Motion Control,

Vibration Control, Optics &

Optoelectronics

<http://www.linoss.com>

MINUS K TECHNOLOGY

Vibration Control

<http://www.minusk.com>

MMR TECHNOLOGIES

Cryogenic Instruments

<http://www.mmr.com>

NUTFIELD TECHNOLOGY

Optics & Opto-Mechanics

<http://www.nutfieldtech.com/nutfield>

OBJECTIVE IMAGING

Microscopy

<http://www.objectiveimaging.com>

PRIOR SCIENTIFIC

Microscopy

<http://www.prior.com>

SCAPS

Optics & Optomechanics

<http://www.scaps.com>

ZABER TECHNOLOGIES

Motion Control

<http://www.zaber.com>

LASERS

AMTRON

Laser Electronics

<http://www.amtron.net>

LITRON LASERS

Lasers Nd:YAG

<http://www.litronlasers.com>

QUANTEL

Fiber Lasers

<http://www.quantel-laser.com>

SINGAPORE

55 Kaki Bukit View
Kaki Bukit Techpark II
Singapore 415976
Republic of Singapore
T: (65) 6844 0055
F: (65) 6844 0655

SHANGHAI

N0.555 Nanjing West Road
Unit 226, Shanghai
P.R.China 200 041
T: (86) 021 6256 2268
F: (86) 021 6256 2278

SHENZHEN

Room 3902M Hongchang Square
2001 Shennan East Rd
Luohu District
Shenzhen
T: (86) 0755 82682155
F: (86) 0755 82682156

KUALA LUMPUR

No. 9, Jalan USJ 21/11
47620 Subang Jaya
Selangor Darul Ehsan
Malaysia
T: (603) 8023 6969
F: (603) 8023 6161

BANGKOK

731 PM Tower, 9th Flr.,
Asoke-Dindaeng Rd.,
Dindaeng,
Bangkok 10400
Thailand
T: (662) 640 2955
F: (662) 640 2958

HANOI

158 Quan Nhan Street
Trung Hoa Ward
Cau Giay District
Hanoi,
Vietnam
T: (84) 43 556 8505
F: (84) 43 556 8506

HO CHI MINH

Room 316,
Duy Tan Plaza,
10 Ba Thang Hai,
Street Ward 12, District 10,
Ho Chi Minh, Vietnam
T: (84) 85 404 2748
F: (84) 85 404 2625

For any enquiries or more details on our products & services,
please email: enquiry@zugophotonics.com or visit our website at www.zugophotonics.com.