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New Updates

in www.zugophotonics.com

In today's dynamic world, **Change** is the only constant. Adhering to our vision of being the leading distributor in Asia and beyond, **Zugo Photonics** is constantly collecting feedbacks on customers' needs and keeping ourselves abreast of new technologies and products that are relevant to these needs.

Photonics, being an enabling technology, is a multi disciplinary field that deals with issues in the generation, transmission, detection and utilisation of light. Despite the recent slowdown of global technology industry, photonics remains the key enabler to meet the increasing demand cutting across different industries like healthcare, telecommunications, renewable energies, just to name a few.

With its beginnings as a photonics provider fifteen years ago, **Zugo Photonics** has since honed its expertise in the field and expanded its reach into various R&D and industrial segments to better serve our customers. Key segments include **Biomedical and Life Science, Microelectronics** and **Precision Engineering**.

New information has been added to our website under the **Industry Focus** segment and these user-centric pages allow visitors to maneuver easily from the industry introduction to the applications page. Industry-specific brochures have also been uploaded on the respective sites to provide you with a general overview of these industries.

For more information, please follow the link [HERE](#) to visit the website.

New Partner

ZABER

Simplifying Motion Control

Zugo Photonics is proud to announce that we have been appointed by Zaber Technologies to be its distributor in China. The partnership will further enhance Zugo's commitment in Precision Motion Control and add Zaber's extensive line of computer controlled motorized linear slides, miniature linear actuators, motorized rotary stages, motorized mirror mounts, goniometers to our family of Motion Control products.

About Zaber Technologies

Zaber Technologies was founded in 1997 by a group of friends with diverse interests and knowledge of electro-mechanical systems, programming, and physics. Zaber's founders recognized the need for an inexpensive, integrated solution for motion control. They wanted to make motion control products that were easy to set up and ready to use right out of the box, so they created the world's first precision linear actuator with a built-in controller. It was based on a stepper motor instead of a DC motor, gearbox, and encoder combination. The integration of all control and drive electronics in the same package became the foundation of Zaber's ever-expanding T-Series product line.

Since the introduction of the T-LA28, they have expanded the T-Series family to over one hundred motion control products, which are distributed worldwide.

Quick Bytes

Laser World of Photonics China 2009 - Review

LASER World of PHOTONICS China 2009 took place successfully at the Shanghai New International Expo Center from 17 – 19 March 2009.

Despite the international economic slowdown, the global laser and photonics industry is still exhibiting strong growth in China.

Zugo Photonics, together with other 219 exhibitors from 14 countries and a record breaking number of over 22,000 visitors from 32 nations have had a rewarding and interactive session during this 3 day event.

We will like to thank our principals for providing their steadfast support and also to the guests who have visited our booth during the event.

Thank you!



▲ Crowds gathering in front of Zugo's booth



▲ Leo explaining Linos' stages to interested customers.

16 April

Singapore Microscopy Seminar

Discovery Lecture Theatre,
Level 4, Matrix, Biopolis



Dr Markbrowne from **Andor Technology** has given an insightful talk on “**Laser Spinning Disc Confocal Technology for Live Cell Imaging**” at the Microscopic Seminar held in the Biopolis. The talk covered topics from **Dual Disk Confocal Operations**, **Photobleaching** to **Ablation**, which are some of the focus applications of Andor Technology.

Zugo Photonics, a participant and co-organizer of the event, has benefited greatly from the session and we will like to extend our appreciation to the Singapore Microscopic Society for initiating the event.

ICMAT 2009

International Conference on Materials for Advanced Technologies
Suntec Singapore Convention & Exhibition Centre

ICMAT 2009 is a multidisciplinary forum providing over 2000 research scientists and engineers a first-hand learning platform, as well as the opportunity to share and exchange ideas with some of the best minds in the field. There will be 23 Symposia covering contemporary topics of importance for the science, engineering and technology of materials, and the technical program includes Plenary, Keynote, Invited, Oral and Poster presentations.

Zugo Photonics is taking part in this event and we will be showcasing our range of Rsoft Design Simulation Software, MinusK Vibration Isolation Platform and Newport Table Top Spectrometer.

Please join us at the event at **Booth B6, Suntec Gallery, Level 3.**

29 June – 1 July

Zugo Mailbox



Dear Readers,

Here are some Q&As that we have gathered to-date. You are welcome to provide your comments and feedbacks as well as pose any enquiries of yours and we will do our best to provide the answers in the next issue of **UPDATES**.

Q: What is the difference between a Lens Holder and a Len Mounts?

A: Technically speaking, there is no difference. They are just different ways of stating how a mount is designed to accept a lens.

Q: What is the difference between a Spectraradiometer and a Spectrophotometer?

A: A Spectraradiometer measures the intensity of radiant energy (Radiance and Irradiance) whereas a Spectrophotometer measures the Luminance and Illuminance of visible light.

F-Theta-Ronar Lenses 532 nm



LINOS
A member of the Qioptiq Group

Increasingly higher laser outputs even for shorter wavelength demand new solutions for optics in laser material processing.

The newly developed LINOS F-Theta-Power-Ronar lens with a **focal length of 160mm** permits an improved **input beam diameter of up to 15mm** with a $1/e^2$ Gaussian beam profile, achieving a **spot diameter of 12µm**. It allows an **image field of 98.7 x 98.7mm²**.

The second lens in the new F-Theta-Power-Ronar series has a **focal length of 330 mm** and permits an **input beam diameter of up to 14mm** with a $1/e^2$ Gaussian beam profile, achieving a **spot diameter of 23µm**.

Those lenses are optimized for sophisticated applications with high requirements regarding power densities.

Please click [HERE](#) for more information.

▲ F-Theta-Ronar Lenses 532nm

Ytterbium (Yb) Fiber Laser Marking Systems

Designed to deliver highly stable, reliable and consistent performances is Ilios Systems' advanced series of continuous wave (CW) and pulsed fiber laser marking systems. Virtually maintenance-free, these robust and energy efficient systems come with laser sources that can operate for over 20,000 hours.



ilios

System Enhancements - Dual Scan Head

Enjoy twice the marking speed and marking area of a specimen using the same fiber laser system with a dual scan head! Two heads are definitely better than one for higher throughput and greater productivity.

Applications Continuous Wave (CW)

- Electronics
- IC Packages
- Labels
- Plastics
- Smart Cards

Applications Pulsed

- Capacitors
- Day & Night Design
- IC Packages
- Keypad
- Labels
- Metal
- Plastics
- Smart Cards
- Wafer

◀ Ilios Ytterbium Fiber Laser Marking System

Please click [HERE](#) for more information.

Linear Slides and Linear Stages

Zaber's T-LSR series products are computer controlled motorized linear stages with a variety of lead screw pitches and travels. They are stand-alone units requiring only a standard 15V power supply. A potentiometer knob at the end of the unit permits smooth manual control; turn it fully to get maximum speed.



▲ Zaber's T-LSR Series

Product Highlights

- All of Zaber's T-Series products have integrated stepper motor controller and motor driver.
- 200 step per revolution stepper motor, microstepped up to 128x to provide smooth and precise motion.
- Multiple units can be daisy-chained and controlled via serial port without additional hardware.
- Powered by standard AC/DC adaptors (included in kits), a convenient and inexpensive solution.
- Zaber's innovative slide design can support 2 to 4 times the load (up to 20kg) of competing designs.
- T-LSR slides are available in a variety of travel lengths and leadscrew pitches.
- Multiple T-LSR stages can be assembled in XY or XYZ configuration without additional hardware.

Tilt and Goniometric

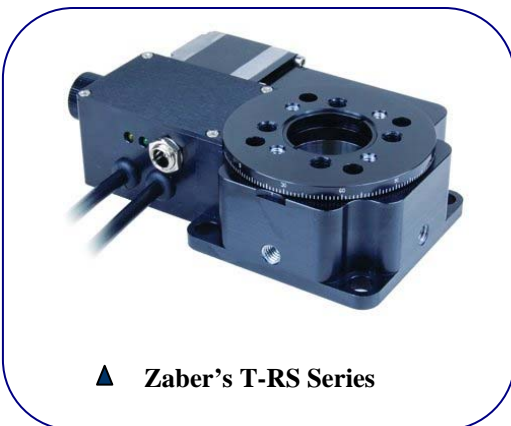
The LMG Series goniometers are some of the most compact stages of their type available. They provide precise rotational movement about an axis in space directly above the stage surface.

The LMG Series goniometers are constructed with precise, accurate positioning in mind. Their design incorporates a rigid yet lightweight aluminum body with a brass top plate, pre-loaded cross-roller bearing slides, worm screw drive, flex-couplings, opto limit switches and two phase stepper motors compatible with Zaber's T-CD Series Stepper Motor Controllers.



▲ Zaber's LMG Series

Rotary Motion



▲ Zaber's T-RS Series

Zaber's T-RS60 rotation stage provides precise, continuous 360° rotation in a compact package. The compact bearing design allows the stage to handle up to 45 kg (99 lb) of load. A precision worm gear provides a 120:1 ratio allowing a stage resolution of 0.00023 deg. The built-in controller makes set-up a snap; just plug it into a computer and it is ready to use.

Product Highlights

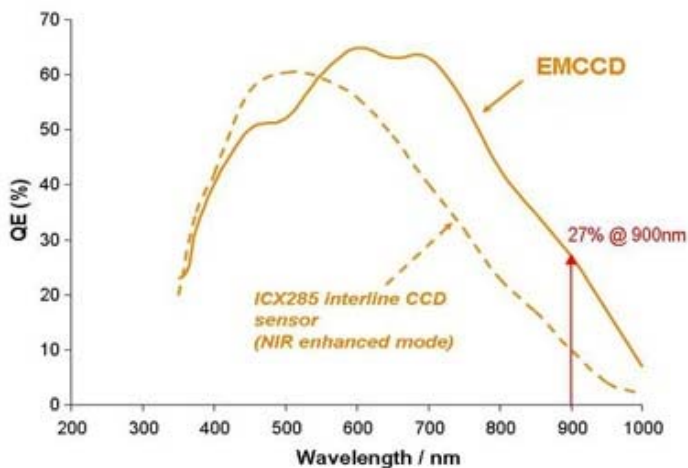
- Continuous 360° rotation stage with built-in controller
- Handles heavy loads with a compact footprint
- 0.00023 deg resolution

Photovoltaic Electroluminescence Imaging

Solar cells and panels are steadily coming of age and may soon become a viable and efficient tool which may ultimately allow us to tap into virtually infinite source of clean energy. Before that can happen, photovoltaic modules need to evolve to become more efficient at solar energy conversion, and cheaper to find their way to households around the globe.

Current high costs of solar energy are directly linked to the relatively low efficiency of modern panels and this, in turn, is influenced by defects within solar cells and panels. Such structural defects may stem from challenges in silicon processing and the quality of crystalline lattices or they may be caused by faulty electrical connections on otherwise functional cells.

To address these issues, an array of photo-emissive diagnostic and quality control tools for solar cell research, based around camera detection systems, has been rapidly developing over the past few years.



Scientific CCD cameras are very well suited for solar cell quality control processes. CCDs with their two-dimensional array sensors, high Quantum Efficiency (QE), low read noise and down to sub-second frame read out, represent excellent tools for high-throughput testing of individual photovoltaic cells and larger panels.

The sensitivity inherent to CCD-based detection is well placed to harness the phenomenon of induced electroluminescence (EL) from solar cells and modules, utilizing weak emission in the Near Infra-Red (NIR) to detect shunts, crystalline defects and broken finger electrodes during cell manufacturing process.

Electron Multiplying (EM) CCD technology, which combines single photon sensitivity and high QE, offers additional advantages when dealing with low-light EL signals, making it possible to record the faintest of signals. Including CCD / EMCCD technology in solar cell / photovoltaic research can significantly improve the quality of solar panels as well as contribute towards development of cleaner sources of energy.

Electroluminescence

Luminescence imaging takes advantage of the radiative inter-band recombination of excited charge carriers in solar cells. The emitted photons can be captured with a sensitive CCD camera to obtain an image of the distribution of radiative recombination in the cell. This distribution is determined by the local excitation level, which allows the detection of electrical losses and can be used to map the diffusion length of minority carriers.

As the emitted light is of very low intensity and in the near infra-red, the camera must have a high sensitivity in the wavelength range of 900 to 1100 nm and little thermal noise.

Experimental Setup

The whole setup is surrounded by plastic sheets, allowing no ambient light to enter.

The camera is placed above the samples on a linear stage to allow for different display windows, making measurements of samples sized 2 x 2 up to 21 x 21 cm² possible. The objective lens can be fitted with spacer rings for detailed close up images.

For electroluminescence images, the solar cells are supplied via their metal contacts with an external excitation current by a programmable power supply, while the camera takes an image of the emitted photons. Typical exposure times are in the range of 1 to 60 s.

The power supply can deliver defined currents or voltages in all four quadrants of the IV characteristic, which allows for luminescence images with combined electric and optic excitation in the future.



▲ The experimental setup for electroluminescence measurements. The cell is placed underneath the camera and electrically contacted from both sides.

Results

Electroluminescence imaging can be used to detect a multitude of defects in crystalline silicon solar cells, for example cracks, grain boundaries, broken contacts and shunts. It can also yield absolute mappings of serial resistance and diffusion length.

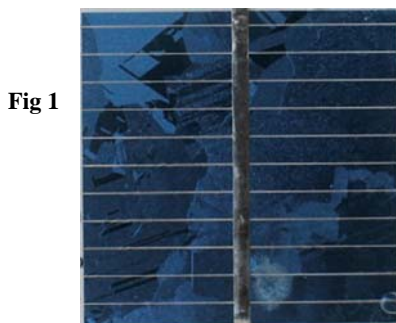
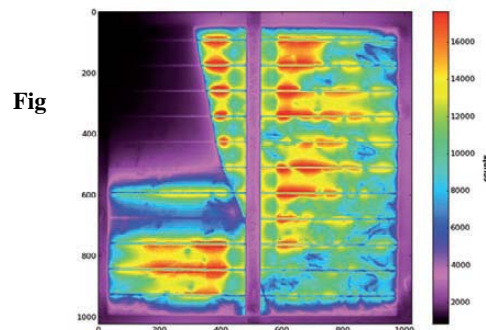


Fig 1

▲ Visual image of a solar cell in a laminated module.



Fig

▲ Electroluminescence image of a the same cell.

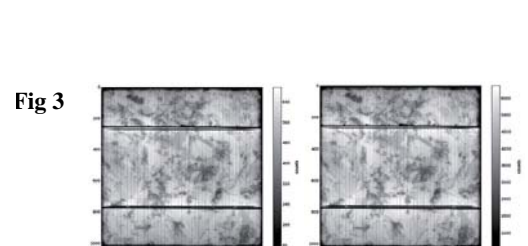


Fig 3

▲ Electroluminescence image of the same cell at 20mA/cm² excitation current density and exposure time of 1s and 10s respectively.

The figures above show the visual and the electroluminescence image of one multicrystalline 3 x 3 cm² cell out of a laminated lab prototype module are shown. The electroluminescence image clearly shows a crack in the left half of the cell, which is not visible in the photograph (Fig 2). This crack was introduced while laminating the module and reduces the current of the whole module by ~25%. The effects of series resistance can also be seen in figure 3, as the radiation intensity decreases along the contact fingers towards the borders of the cell and in the area between these fingers. The difference in quality is very small, showing that the camera can deliver high quality images even at the short exposure times required for inline measurements in solar cell mass production.

UPDATES

Product Index

PHOTONICS

CAPACITEC

Test & Measurement

<http://www.capacitec.com>

FLUIGENT

Microfluidics

<http://www.fluigent.com>

LINOS PHOTONICS

Light Source, Motion Control,

Vibration Control, Optics &

Optoelectronics

<http://www.linostech.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>

SCAPS

Laser Scanning/Marking Software

<http://www.scaps.com>

ZABER TECHNOLOGIES

Motion Control

<http://www.zaber.com>

LASERS

AMTRON

Laser Electronics

<http://www.amtron.net>

ILIOS SYSTEMS

Laser Systems

<http://www.ilios-sys.com>

LITRON LASERS

Lasers Nd:YAG

<http://www.litronlasers.com>

QUANTEL

Fiber Lasers

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

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