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Going Green

Renewable Energy

With Earth's rapid depletion of natural resources, coupled with climate change concerns and high oil prices, it is little wonder that alternative energy sources like green and natural resources, are now taking center stage.

The green industry has benefitted tremendously from government support in terms of driving renewable energy legislation, increase spending and other forms of incentives and commercialization, and it look poised to weather the 2009 economic crisis better than many other sectors.

Since 2006, 18% of global final energy consumption came from renewable energy such as biomass, hydroelectricity, tidal, wind energy, geothermal, photovoltaic as well as other organic sources such as ethanol.

Leading the pack are the Wind Power and Photovoltaic industries. Wind power is growing at the rate of 30 percent annually, with a worldwide installed capacity of 121,000 megawatts in 2008. The photovoltaic industry annual manufacturing output also reached 6,900 megawatts in 2008, and their popularity is apparent in countries like Germany, Spain and USA.

Countries in Asia are also actively participating in this trend towards going green. About 16 percent of China's electricity came from renewable sources and investment in renewables is now part of the country's economic stimulus strategy. Singapore and many Southeast Asian countries are also investing in the renewable energy field as doing their part for the environment and a means of ensuring energy security in time to come.

Having fifteen years of experience in the photonics market, Zugo Photonics is drawing on our past experience and investing our resources to further enhance our expertise in the green industries. Current capabilities include Test & Measurement instruments for the wind turbine industry, solar simulation for the PV industry, and turn-key laser systems for the manufacturers.

Newport, New Focus

Newport Corporation has acquired Oclaro's **New Focus** business, comprising of a portfolio of high-performance photonics products that include opto-electronics, high resolution actuators, opto-mechanics, tunable lasers, vacuum and ultraclean solutions, and OEM-engineered solutions.

The strategic move will further enhance Newport's position as the global leader of advanced technological products and provides greater product variety to its already well established repertoire.

Zugo Photonics welcome the new partnership and we look forward to continue and develop successful working relationships with Newport and New Focus.

New Partners

Forward looking and always placing customers' needs close to our heart, **Zugo Photonics** has constantly been on the quest to source for new products to complement and expand our current product range.

The partnership with **AIST-NT** and **TK Instruments** will further strengthen our product portfolio in the field of Scanning Probe Microscopy and Terahertz Instruments and we believe that the sharing of their expertise in their respective fields will be beneficial to our customers who are carrying out their work in these areas.



With over 15 years experience in combined AFM/SPM/Raman

Spectroscopy, **AIST-NT** main focus is on the innovative research and development of advanced integrated scanning systems for nanotechnology.

Besides the most progressive engineering in the field which includes customizing devices for OEM customers, outsourcing and R&D in nanotechnology, **AIST-NT** offers the highest quality service and customer support.



Based within the Physics Department of Cardiff University, **TK Instruments** develops Terahertz Instrumentation, covering a frequency range from Microwaves to the Far Infrared.

The company also has cryogenic detectors and Quasi-optical systems operating in areas as diverse as atmospheric remote sensing, astronomy, semiconductor materials characterization; Plasma fusion diagnostics and electron spin resonance spectroscopy.

Important Notice!

As our fiscal year is drawing close, we will like to invite you to write in to us for any contribution or sponsorship of conferences, workshops or corporate events* in **2010**. Please do so before **6th November 2009**.

For more information, please contact us at 6844 0055 or email us at enquiry@zugophotonics.com.

* Agreement of sponsorship or contribution will be at the discretion of the company.



Infraspection 2009

Infraspection Institute Level 1 Certification Course

The 5-day intensive course has seen the participants going through a series of theoretical and hands-on session where they have learnt how to collect quality data, accurate temperature readings and account for measurement effects such as distance and emissivity using infrared cameras.

Costly mistakes such as fire from undetected hotspots can be avoided as the participants learn to distinguish between hot spots and reflections, direct versus indirect readings as well as qualitative versus quantitative thermography.

24 – 28 Aug

Uncovering Biological Phenomenon at Evanescence

No.11 Biopolis Way, #01-02
Helios Building

7 Aug

The seminar on "**Uncovering Biological Phenomenon at Evanescence**" will be held in conjunction with the contract renewal signing ceremony of SBIC Nikon Imaging Centre.

Zugo Photonics has been a proud sponsor of this initiative for the past 2 years and we are glad to be able to support SBIC Nikon Imaging Centre in its quest to serve the research community in Singapore.

This comprehensive centre houses advanced light microscopy essentials, including our Newport vibration control workstations and Prior motion control motorized stages.



China International Exhibition Center, Beijing

ILOPE is the premier exhibition in China showcasing products for Lasers, Optoelectronics, Optics and Sensors.

It serves as a bridge linking suppliers, buyers, experts and technicians from across the globe to enhance the communication of business affairs and exchange of information and views between them.

Having a successful turnout for ILOPE 2008, **Zugo Photonics** will once again be joining 329 exhibitors from Canada, Germany, Italy, France, Japan, UK, USA, Taiwan, South Korea, Israel, Russia, and Hong Kong respectively to take part in this premier event of the year.

Please join us at the event at China International Exhibition Center, Hall 3, Booth **3803**.

21 – 23 Oct

We are 15!

Started in 1994 as a photonics components distributor, **Zugo Photonics** has always been committed to delivering quality products and dedicated services to our customers.



Leveraging on its fifteen years of experience in the photonics and lasers markets, **Zugo Photonics** has built upon itself a strong and deep rooted foundation while continuing to expand into new territories.

Representing 52 leading principals of their fields in 7 offices across 5 countries in Asia, **Zugo Photonics** is clearly the leader amongst the pack and we are poised to take on greater responsibilities and expand our product range to provide more comprehensive services to our customers and principals alike.

We will like to thank our customers and principals for their past support and we will continue to excel in our field to provide you with greater value-add in the next 15 years.

5 Sep

Supported by **RSoft Design Group**, NTU's **Network Technology Research Centre (NTRC)** and organized by **Zugo Photonics**, the RSoft End User Meeting serves as an ideal platform for the creators, users and future users to share their experiences and applications with fellow researchers in the fiber optics and network research area.

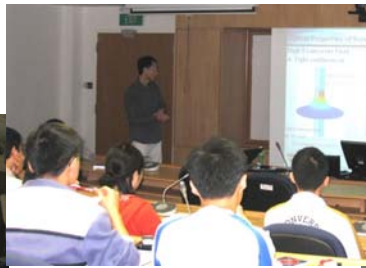


The half day event began with an introduction of RSoft's latest software by Mr Dan Herrman, followed by a series of enlightening presentations by Dr Jason Png from IHPC and Mr Wang Guanghui and Ms Dora Hu from NTRC. Topics that were covered include *Design of Nanostructure Optical Fiber*, *Simulations of Microstructured Optical Fibers*, and *Computer Simulation of a selection of Photonics devices*.

Up and coming softwares include the **Solar Cell Utility**, which is designed to be used with other RSoft softwares to simulate solar cell structures with both periodic diffractive optical elements as well as non-periodic diffuse interfaces and the **Tapered Laser (TL) Utility**, which provides an efficient and accurate design tool for analyzing and optimizing tapered semiconductor laser diodes.

Insightful feedback and pointers were also collected and exchanged during the session and we will like to thank the co-organiser NTRC, principal and participants for contributing to this event.

- ▶ Presentation by Dr Jason Png and Mr Wang Guanghui



- ▶ Presentation of a token of appreciation to the speakers.



- ▶ Audiences listening attentively during the seminar

Zugo Mailbox



Q: What is "Photometry"? What is "Radiometry"?

A: Radiometry is the measurement of optical radiation, which is electromagnetic radiation within the frequency range between 3×10^{11} and 3×10^{16} Hz. This range corresponds to wavelengths from ultraviolet, the visible to the infrared.

Photometry is the measurement of light, which is defined as electromagnetic radiation which is detectable by the human eye. It is thus restricted to the wavelength range from about 360 to 830 nanometers (nm; 1000 nm = 1 mm).

Q: How do they differ?

A: The only real difference between radiometry and photometry is that radiometry includes the entire optical radiation spectrum, while photometry is limited to the visible spectrum as defined by the response of the eye.

Product Showcase



Atomic Force Microscope

Scanning Probe Microscopy has been widely used for the characterization of different nano-sized objects and a great number of other scientific and commercial activities defined by the term “nanotechnology”.

With its expanding applications come more complicated and demanding challenges, one of it includes the adjustment of most modern SPMs. This drawback leads to poor reproducibility of the instrument settings and consequently to poor reproducible results.

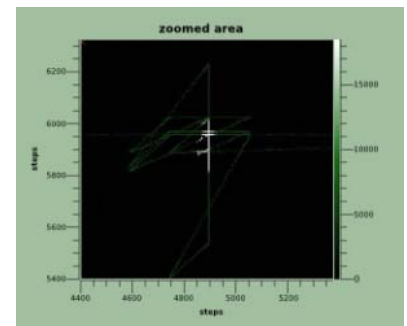
AIST-NT has developed a new, *fully motorized* AFM which allows the perfect alignment of the cantilever, laser and photodiode by just one click on a command button. The scanning settings and landing parameters are also automated that allows to avoid any time consuming adjustment operations, thus leaving more time to researcher for designing the experiment and performing more accurate measurements.

Unique features:

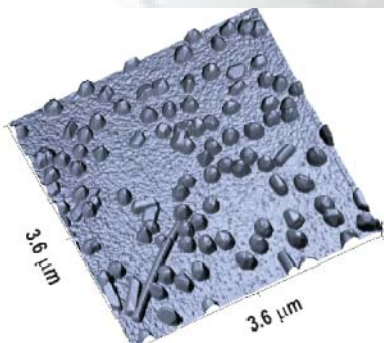
- Capability to map the distribution of the oscillation amplitude along the cantilever.
- Complete automation of the AIST-NT’s AFM setup allows researchers to avoid time consuming and tiresome routine adjustments and concentrate on the experiment, measurements and result interpretation.
- Extra-safe and at the same time fast landing procedure makes it possible to protect even very sharp tips from any possible damage.
- Availability of the true non-contact scanning mode allows one to measure even the most fragile and mechanically sensitive samples.
- Unique smart scanning procedures allow to high quality images to be obtained on very challenging objects like 130 nm Ag nanoparticles or modern high density hard drive disks.
- Scanner with built-in capacitive sensors shows the unmatched performance characteristics



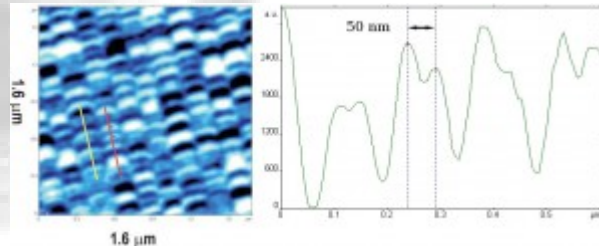
▲ SmartSPM1000



▲ Automated, one-click laser-to-cantilever alignment.



◀ 130 nm Ag nanoparticles immobilized on the metal surface, 3.6x3.6 um scan.



▲ High resolution MFM image of Seagate Barracuda 750Gb Hard Drive, ST3750640AS.



“ Delivering high performance and advanced functionality in a compact package, the OASIS-blue universal PCI motion controller establishes the new standard for automation in microscopy and imaging.”



▲ Oasis Blue Control Card: Actual physical dimensions: 152 mm x 97 mm (6" x 3.8")

The **OASIS-blue** 4 axis precision stepper motor controller with on-board drivers offers a single-slot solution for motorized XY stages, Z focus drives, filter wheels, and shutters. Smaller than a standard PCI short card, the compact, elegant design and universal PCI form factor of the OASIS-blue enhance compatibility over a wide range of PC enclosures, providing maximum automation performance with the minimum footprint.

The OASIS-blue is complemented by an extensive library of motion control functions and software utilities.

Unique features:

- Versatile 4 axis precision micro-stepping controller
- Ultra-compact design for maximum compatibility
- On-board drivers for complete solution
- Motor drive power through internal +12 V PC supply or external power to +40 V
- Compatible with a wide range of 3rd party XY stages, Z focus motors, filter wheels, and shutters
- Universal PCI 2.2 compliant for 3.3 V and 5 V busses
- On-board dual shutter controllers
- Powerful DSP processor for optimal performance
- Read/write flash memory for secure configuration settings
- Critical safety features for thermal and current protection
- General purpose TTL input and output channels
- Optional daughter modules for encoder support, camera trigger synchronization, and advanced functions
- Extensive library of motion control software

Terahertz 101

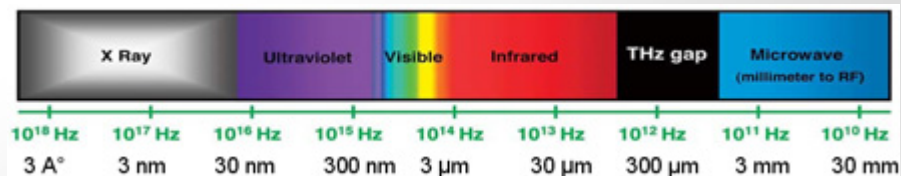
Up till recently, researchers did not extensively explore the applications and interactions in the terahertz spectral region as reliable sources of terahertz radiation are not easily available. However, as continuous wave and pulsed sources become readily available, terahertz wavelength applications are again being pursued by investigators from various fields.

So what is TeraHertz?

TeraHertz (THz) radiation is a non-invasive form of radiation that lies between the infrared and microwave range of the electromagnetic spectrum. It is defined in the frequency range of 0.01 to 10 THz ($1\text{THz} = 10^{12}\text{Hz}$)

Like infrared radiation or microwaves, these waves usually travel in line of sight. Terahertz radiation is non-ionizing submillimeter microwave radiation and shares with microwaves the capability to penetrate a wide variety of non-conducting materials. Terahertz radiation can pass through clothing, paper, cardboard, wood, masonry, plastic and ceramics. It can also penetrate fog and clouds, but cannot penetrate metal or water

TeraHertz Spectrum



Importance of TeraHertz and its Applications

- ❖ THz radiation is a safe, accurate, and economical alternative to other scanning methods such as high frequency ultrasound, Magnetic Resonance Imaging (MRI) and near-infrared imaging.
- ❖ Unlike X-rays, Terahertz radiation is non-ionizing, and thus is not expected to damage tissues and DNA.
- ❖ Terahertz radiation can also detect differences in water content and density of a tissue. Such methods could allow effective detection of epithelial cancer with a safer and less invasive or painful system using imaging.
- ❖ THz exhibits extremely low photon energy so that there is no danger that chemical bonds are broken up and that the examined material is changed.
- ❖ The emitted power is very low leading to insignificant heating.

Medical Imaging



▲ Skin cancer detection

A few application examples are:

- Disease diagnostics
- Identifying dental caries
- Assessing the magnitude and depth of skin burns
- Cancer detection (e.g skin & breast cancer)
- Determining tissue hydration levels
- 3D imaging of teeth

Pharmaceutical Applications

- ❖ THz provides both structural and functional information, which makes it an exceptional tool for both spectroscopy and imaging.
- ❖ Spectroscopic THz analysis may also be used in genetic diagnostics, environmental sensing, to help identify explosives, to detect biological agents, to screen pharmaceuticals, and to investigate material characteristics.

T-Rays are ideally suited to act as a monitor to provide additional insight into changes to protein structure and identification of unknown samples.

A few application examples are:

- Polymorph Recognition
- Molecular Recognition
- Protein Folding
- Ingredient Quantification
- Drug Counterfeiting
- Non-destructive Tablet Coating Analysis
- In-line Probing and Quality Assurance
- Drug Stability Test after Manufacture



▲ An Acetaminophen caplet under test

These practical applications would enable pharmacies to have much better control over quality control, statistical process control, and quality assurance, from the manufacturing process through to sample storage conditions.

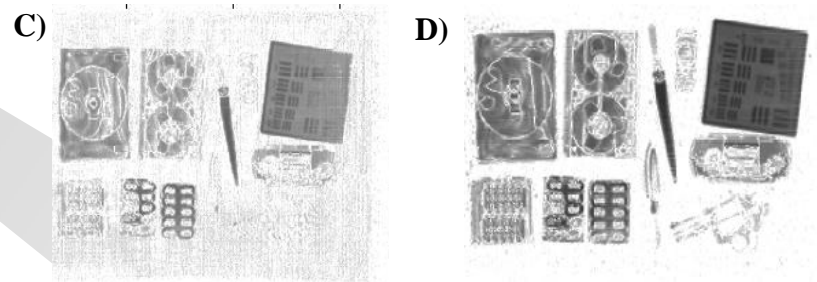
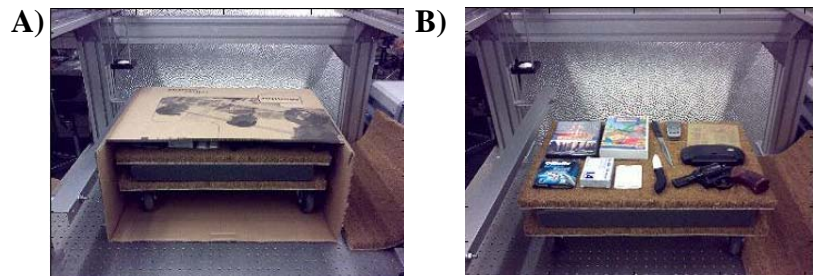
- ❖ THz exhibits unique characteristics not found in other portion of the electromagnetic spectrum.

- ❖ THz can safely penetrate materials such as clothing and plastics to image concealed objects and spot manufacturing flaws.

- ❖ THz radiation can penetrate almost any material except for water and metal. THz imaging often allows a better image quality than subsonic or x-ray imaging, while THz waves are also harmless. In addition, THz allows free-space coupling to the device under test!

- ❖ A few application examples are:
 - Quality Control: Finding Hidden Defects
 - Hidden Surface Characterisation
 - On-line Thickness Control of Coatings
 - Package Inspection
 - Security Screening

Package Inspection



▲ A & B - Photograph of measurement scene with and without cardboard box.
C -& D - THz tomographic cross section with and without cardboard box.

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

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