



NEWSLETTER

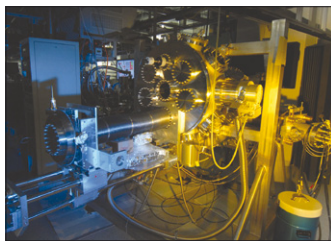
COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

ICO Prize goes to attosecond scientist

Reinhard Kienberger of the Technische Universität München, Garching, Germany, was awarded the prize for his “breakthrough work in attosecond science and its applications in metrology and spectroscopy”.



Prof. Reinhard Kienberger.



A view of Kienberger's laboratory.

Reinhard Kienberger was born in Graz, Austria, in 1971. He studied electronic engineering at the Technische Universität, Vienna. His scientific career started in 1998 with his diploma thesis: “Set-up of an automatized measurement system for the spectral analysis of X-rays”. At the start of his PhD studies in the group of Ferenc Krausz in Vienna, he worked on relativistic electron acceleration by ultrashort high-energy laser pulses and participated in experiments in femtosecond X-ray fluorescence in boron and carbon by use of high-order harmonic generation (HHG) from ultrashort laser pulses.

Later on, he concentrated on HHG source development and measurement methods. By filtering a spectral band in the cut-off region of harmonics generated by few-cycle laser pulses having a cosine-shape, he – with a few co-workers – succeeded in the generation of isolated sub-femtosecond XUV pulses, the first flashes of light measured that were shorter than one femtosecond.

In 2004, within the framework of a fellowship from the Austrian Academy of Sciences, Kienberger was working as a visiting scientist at the Stanford Linear Accelerator Center (SLAC) in Menlo Park, California, US. He developed a new measurement system for the temporal characterization of linac-based ultrashort X-ray pulses. This method has recently been implemented at the Linac Coherent Light Source (LCLS) at SLAC, the world's first X-ray free electron laser.

In 2005 Kienberger moved to the Max Planck Institute of Quantum Optics in Garching, near Munich, Germany. He became leader of a Max Planck Junior Research Group and received the Sofja Kovalevskaja Award of the Alex-

ander von Humboldt Foundation. In 2008 he became professor of experimental physics at the Technische Universität Munich and received a prestigious starting grant from the European Research Council.

During this decade Reinhard Kienberger has contributed decisively to a series of first-time scientific achievements like the generation and measurement of a single sub-femtosecond pulse, steering the atomic-scale motion of electrons with light fields, the real-time observation of an atomic inner-shell decay, the measurement of time intervals as short as 100 attoseconds, the sampling of the electric field of visible light, the time-resolved measurement of attosecond electron transport in a solid, and the single-shot measurement of the absolute phase (carrier envelope phase) of a few-cycle laser pulse, all published in *Science* and *Nature*.

The ICO Prize Committee, chaired by Prof. Min Gu (Swinburne University of Technology, Australia), on giving this award recognized Kienberger's “breakthrough work in attosecond science and its applications in metrology and spectroscopy” and emphasized that attosecond technology is not a simple extension of femtosecond technology to a new timescale but a radically different technology. Controlling electrons is at its very heart. Kienberger has made breakthroughs: the first ever generation of electromagnetic pulses lasting less than a femtosecond; the first time-resolved observation of light oscillations and release of an electron from its atomic (bound) state; the first ever real-time observation of electron motions deep inside an atom; the first precision measurements in the attosecond range by means of the so-called light-field-driven streak camera.

ICO rewards lifelong effort in optics education in Iran

The Galileo Galilei Award 2010 was awarded to Prof. Mohammad Taghi Tavassoly.

Mohammad Taghi Tavassoly was born in Hamadan, Iran, in 1942. He received his BSc and MSc in physics in 1966 and 1968 from the University of Tehran. He worked for five years as assistant to the late Prof. M Hessabey, the founder of the first physics department in Iran. He learned valuable lessons from him. During that period, Tavassoly designed a series of

experiments for education in optics and electromagnetism and established an optics lab at Shahid Beheshti University. He received his PhD from London University (RHC) in 1977.

Back home during a period of political tensions and eight years of a frustrating war, Tavassoly concentrated his efforts on building up the infrastructure required for advanced education



Prof. Mohammad Taghi Tavassoly,
University of Tehran, Iran.

and research. In collaboration with colleagues he translated and wrote textbooks, compiled an English-Persian and Persian-English dictionary of physics, instigated the *Iranian Journal of Physics*, now 27 years old, founded a technical school for training opticians, re-organized the Physical Society of Iran and served as a board member for five terms. He founded the optics committee and served as its president for three terms. Later this committee developed into the Optics and Photonics Society of Iran. Both societies have been very active in organizing annual conferences, national and international workshops, awarding awards, and publishing journals, newsletters and books.

After the war, in 1988, his attention turned to graduate-level education and research. He collaborated with Prof. Y Soubuti, the founder of the Institute for Advanced Studies in Basic Sciences (IASBS) in Zanjan, to build a research lab for optics there. He also established a new optics research lab at the University of Tehran. A considerable number of optics projects have been carried out at both places.

Tavassoly believes that, for sustainable research, public support is vital and it can be attracted by doing research that deals with local issues. With this in mind, he imposes three conditions on his research projects: (a) it must concern a local issue; (b) it must use facilities within the country; and (c) the results should be publishable in an international journal.

Guided by these rules, Tavassoly has been

working in Fresnel diffraction from phase steps, light scattering from rough interfaces, and applications of Moiré techniques to the measurement of atmospheric turbulences, determination of spectral line shapes, evaluation of MTFs of printers, and specification of liquid-liquid diffusion coefficients.

Tavassoly's research achievements have been reported in more than 50 papers published in journals and SPIE proceedings, and also in more than 100 presentations at conferences. Detailed descriptions of these works can be found in 12 PhD and more than 60 MSc theses that he has supervised, along with some patents. He has also designed and fabricated several optical devices and instruments that are used in industry and research labs.

Tavassoly was awarded his prize by the Galileo Galilei Committee, chaired by Prof. Tomasz Szoplik from Warsaw University, for "his contribution to teaching optics in Iran, conducting original research, and maintaining links between the academic communities active in optics in Iran and the rest of the world". The committee highlighted that besides contributing to teaching optics in Iran, writing original physics textbooks in Persian, creating teaching laboratories, establishing a series of research workshops and conducting original research in his university, Tavassoly's determination helped to maintain links between the academic communities active in optics in Iran and the rest of the world during decades of difficult political relations.

Red Iberoamericana de Óptica is inaugurated in Peru

Within the framework of the most important optics conference in the Iberian American region, the Council of the Iberian American Network was presented to the worldwide optics community.

RIAO/OPTILAS continues to be the most important conference in the Iberian American region. Last September RIAO/OPTILAS was held at the Pontificia Universidad Católica del Perú (PUCP) in Lima, Peru, with more than 400 participants. The conference was chaired by Guillermo Baldwin, who also organized a previous Andean OPTOANDINA school for 65 students, a forum on entrepreneurship sponsored by SPIE, a special conference of Mario Bertolotti in celebration of the 50th anniversary of the laser, and several delightful cultural activities. The conference had a great number of distinguished plenary and invited speakers. Registration fees were waived for 130 students, 54 of them from Peru.

Worthy of special note is the steadily increasing research activity in Peru and Chile in areas like quantum optics. SPIE and OSA granted awards to the best poster presentations. Three SPIE awards went to: Pablo Solano from the Universidad de Concepción, Chile; Dulce-María González-Utrera from the Universidad Autónoma de México, Mexico; and Job Mendoza from the Benemérita Universidad Autónoma de Puebla, Mexico. A single but



The RIAO council. From left: Pedro Andrés (Optical Society of Spain), Efraim Solarte (RIAO's secretary and president of the Colombian Network on Optics), Eric Rosas (RIAO's president and president of the Mexican Academy of Optics), José Luis Paz (Venezuelan Optical Committee) and Manuel F Costa (president of the Portuguese Society for Research and Development of Optics and Photonics). The representative from the Section on Optics and Spectroscopy of the Cuban Physical Society, Juan Darías, could not attend.

more substantial OSA award went to Facundo Orte from ANPCyT and Ceilap (Citefa-Conicet), Argentina, for the "Calculation of erythral irradiance and synthesis of vitamin D with a multiband filter radiometer and annual variation analysis". The peer-reviewed proceed-

ings will be published in *Journal of Physics: Conference Series*, an IOP open-access journal.

A highlight of the conference was the official inauguration of the Iberian American Network on Optics (RIO), which was created in 2008. The RIO council for the period 2010–2013 (above) was introduced to the world optics community in a ceremony that was presided by Eric Rosas, RIO's president, and attended by dignitaries of ICO, OSA and SPIE. ICO president Maria Luisa Calvo expressed the joy of the international optical community at the establishment of this long-awaited organization. Angela Guzmán, ICO secretary, summarized the long history of efforts that led to this outcome. Welcome speeches expressing col-

laborative spirit were also given by Katharina Svanberg, 2010 SPIE president elect, and James C Wyant, 2010 OSA president, who also participated as plenary speakers in the conference.

The RIO council maintains constant communication with all the optical communities in the Iberian Peninsula and Latin America and is seeking the incorporation of other Latin American organizations into the network. The Iberian American community welcomed the active participation of Portugal and chose Braga to host the next RIO/OPTILAS in 2013. The RIO council will help to delineate the general framework within which future RIO-OPTILAS events should be held and will promote and advertise all other regional activities in optics.

Russian lecturer travels to Argentina with ICO grant

Prof. Maxim Tomilin from the State University of Information Technologies, Mechanics and Optics in St Petersburg, Russia, gives the first short course on liquid crystals in Argentina.

Prof. Maxim Tomilin from the State University of Information Technologies, Mechanics and Optics in St Petersburg, Russia, was awarded this year with an ICO travelling lecturer grant toward giving a short course on the optics of liquid crystals (LCs) in several Argentinian research institutions. Tomilin is author of *The LC Interaction with the Surface* (2001, SPb, Polytechnika) and co-author with S Pestov of *The Properties of LC Materials* (2004, SPb, Polytechnika), both published in Russian. He was invited to visit three Argentinean institutions and was hosted by Prof. Hector Rabal at the Optical Research Center at La Plata (CIOp), Prof. Graciela Romero at Salta University and Prof. Liliana Perez of Buenos Aires University.

Tomilin's short course included an introduction on the main classifications, structures, textures, chemical and physical properties of LCs, a lecture on linear and nonlinear optical properties of LCs, and another on applications of LCs in flat-panel displays, tunable photonic devices and recording media used to visualize the distribution of invisible physical fields on surfaces. He gave three additional lectures that covered further applications of LCs as a new tool for detecting surface field distributions and their use in optical technology, crystallography, medicine, biology and patrimony restoration (polarizing microscope based on LCs).

Tomilin is very knowledgeable of the history of optics and co-author with his colleague S Stafeev of the book series *Five Millenniums of Optics*, whose first two volumes – *Prehistory* and *Antique Optics* have been already published in Russian. Argentinean students were also privileged to attend two of Tomilin's lectures on the history of optics. The first, "Optics prehistory", dealt with optical myths, legends and symbols; sky object observation and calendar creation; megalithic viewfinders; first images and letters; megalithic monuments and ancient temples orientation; and optical mysteries of ancient



Prof. Hector Rabal and Prof. Maxim Tomilin in the auditorium of the CIOp.

civilizations. The second lecture, "Eye and lens through millenniums' prism", an account of five millennia of lens development, starts from "archaeological optics" – the fabrication of crystal lenses in ancient Egypt and Babylon for the eyes of sculptures of pharaohs, idols and secret animals; the mystery of Schliemann lenses discovered at Troy; ancient Greece achievements in development the models of vision based on lenses nature; catoptrics and dioptrics; Nero's monocle; the achievements of Arabic scientists in theory of vision and ophthalmology; reading stones; Italian glassmakers and the invention of the spectacles, telescopes and microscopes; Viking lenses. He finished by explaining how adaptive lenses based on liquid crystals will eventually be used to replace the crystalline lens of the eye after cataract ablation.

Tomilin hopes that his visit will be the starting point for local research in the wider field of LC optics.

The travel grant organized by ICO gave an opportunity for exchanging not only scientific information but also traditions in education and culture, and for mutual human contact between scientists working in distant continents.

Laser exhibits educate the public

Exhibition organized by the Centro de Investigaciones Ópticas in La Plata, Argentina.



A stand at the exhibition.

As part of Laserfest and with the support of SPIE, CONICET and CIC, the Centro de Investigaciones Ópticas (CIOP) last August organized the exhibition "The laser in our lives" in the Teatro Argentino, La Plata. It included holograms, photographs and stands showing basic principles and applications of laser in technology, education and entertainment.

Visitors could see disassembled diode, gas and solid Nd-YAG lasers. A fluorescent blue sensitive screen served as a drawing facility, while fine art students enjoyed a graffiti set-up where a video projector provided with a CCD camera and an Nd-YAG pointer laser displayed indoor and outdoor images. A workshop for science journalists was held on lasers and photonics. Imaging systems like a double parabolic mirror helped to display a real image of an object lying at the bottom of the mirror cavity, clearly illustrating its different nature from that of holographic images. The hologram exhibit

included artistic reflection and transmission rainbow holograms, holographic stereograms, brand holograms, and holograms related with the postal service. It constituted a great unveiling of 3D imaging for young children.

Stand themes varied from optical games to advanced research developments like the fibre laser gyroscope developed as a part of the Argentinean satellite SAC-D/Aquarius. JOFA CIOP student chapters developed the stand "Do you know what kind of laser pointer you have?" to raise awareness of laser safety.

The great success of the exhibition, attended by more than 4000 visitors, is documented in an extensive online graphic archive, at www.picasaweb.google.com/laserCIOP and a video at www.youtube.com/user/laserCIOP. This success encouraged CIOP researchers to participate last November in the first Latin American Fair of Science, Technology and Productive Innovation held in Buenos Aires, and to plan educational activities about optics and lasers for the public all over Argentina.

Myriam C Tebaldi, CIOP-CONICET

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Forthcoming events with ICO participation

For more details: www.ico-optics.org/events.html

31 January – 11 February ICTP Winter College on Optics in Imaging Science

Trieste, Italy
Contact: ICTP secretariat, tel +39 040 2240 9932; fax +39 040 2240 7932; smr2132@ictp.it
<http://bit.ly/fkPQhS>

3–7 May International Conference on Applications of Optics and Photonics

Braga, Portugal
Contact: Manuel Filipe Pereira da Cunha Martins Costa, tel +351 253 604070/604320; fax +351 253 604061; mfcosta@fisica.uminho.pt
www.spidof.pt/aop2011

18–20 May Information Photonics (IP 2011)

Ottawa, Canada
Contact: Pavel Cheben, tel +1 613 9931624; fax +1 613 9907656; pavel.cheben@nrc.ca
www.uop.ca/communications/ip2011

7–17 June Panamerican Advanced Studies Institute on Frontiers in Imaging Science

Bogotá, Colombia

Contact: Catalina Ramírez Gómez, tel +57 1 316 5000 ext 14592; cdramirezgo@unal.edu.co
<http://pasi.fau.edu>

8–10 July Education and Training in Optics and Photonics (ETOP)

Carthage, Tunisia
Chair: Zohra Ben Lakhdar
Contact: Mourad Zghal, tel +216 7185 6240; fax +216 7185 6829; mourad.zghal@supcom.mnu.tn
www.esprit-prepa.com/etop

11–13 July 1st EOS Topical Meeting on Photonics for Sustainable Development – Focus on the Mediterranean (PSDM 2011)

Tunis, Tunisia
Contact: Julia Dalichow, tel +49 511 2788 155; fax +49 511 2788 117; dalichow@myeos.org
www.myeos.org/events/psdm2011

15–19 August International Commission for Optics Congress (ICO-22)

Puebla, Mexico
Contact: Fernando Mendoza Santoyo, tel +52 477 44142; fax +52 477 441 4208; fmendoza@cio.mx
www.cio.mx/ICO2011/1.htm

Responsibility for the accuracy of this information rests with ICO. President: M L Calvo, Universidad Complutense de Madrid, Departamento de Óptica, Facultad de Ciencias Físicas, Ciudad Universitaria s/n, E 28040 Madrid, Spain; mcalvo@fis.ucm.es. Associate secretary: Gert von Bally, Centrum für Biomedizinische Optik und Photonik, Universitätsklinikum Münster, Robert-Koch-Straße 45, 48149 Münster, Germany; Ce.BOP@uni-muenster.de.



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