

C H R O N I C L E

**Acousto-Optics and Photoacoustics (AOPA) conference of COO-SPIE Congress  
Warsaw, 28 August – 2 September, 2005**

The **AOPA (Acousto-Optics and Photo-Acoustics)** conference was one of the 14 topical conferences consisting of the **International Congress of SPIE** (The International Society for Optical Engineering) **on Optics and Optoelectronics** organised by SPIE Polish Chapter, SPIE Europe and the Warsaw University of Technology. It was concerned with physical and technological aspects of light and sound interactions (**acousto-optics, AO**) as well as with problems of sound generation by light (**photoacoustics and its spectroscopy, PAS**) and applications of the both domains in physics, technology, biology, medicine, chemistry and other branches of contemporary knowledge. Up the whole 34 papers were presented in which 12 invited, 16 oral and 8 poster presentations. Finally, 30 papers have been accepted for publication in SPIE Proceedings (see below).

The conference had 7 oral sessions and 1 poster session. It started with the keynote presentation at the *Special Events Session 1* by A. Mandelis (University of Toronto, Canada) on new trends in biothermophotonics and bioacoustophotonics of tissues showing intense development and great perspectives in the field.

The *Session 2: PAS in Biomedicine, Biology and Chemistry* consisted of 4 papers: two invited ones on selection of the proper sensitizers for photodynamic therapy using photothermal methods presented by Danuta Frąckowiak (Poznań University of Technology, Poland) and on UV and circular dichroism thermal lens microscope applied in chemistry presented by K. Mawatari (Kanawaga Academy of Science and Technology, Japan) and next two contributed papers on using PAS for trace gas detection (by G. Wysocki, Rice Univ., USA) and for paper pulp measurements (by M. Tormanen, University of Oulu, Finland).

The *Session 3: PAS in NDT* (non-destructive testing) included 3 invited papers: on photoacoustics and photothermics used in NDT by J. Pelzl (Ruhr-Univ., Bochum, Germany), on photothermal spectroscopy of II-VI mixed crystals by J. Zakrzewski (Nicolaus Copernicus University, Toruń, Poland) and on PAS frequency characteristics as a source of information of semiconductor properties by M. Maliński (Koszalin University of Technology, Poland).

During the first part of the *Session 4* some aspects of PAS application for diffusion examinations were presented by J. Bodzenta (Silesian University of Technology, Gliwice, Poland). Next a very fundamental topics on matter waves and light interaction by H. Batelaan (University of Nebraska/Lincoln, USA) and R. Mertens (University of Gent, Belgium) were presented. Batelaan described experimental results on diffraction of electrons by standing light wave.

The phenomena (like modulation effects for instance) manifest themselves in a manner typical for acousto-optical diffraction and the analogy may have the use of further comparisons between the matter waves-light and the light-ultrasonics interaction processes and for their deeper interpretation. Three following papers of the Session (by the group of V. Voloshinov, Lomonosow Moscow State University Russia) were valuable contributions on AO interactions in anisotropic media. One from those papers on glancing incidence and back reflection of elastic waves in tetragonal crystals was presented by **N. V. Polikarpova and she appeared as the winner of the First Prize of the Best Students Presentation Award** of the SPIE Optics and Optoelectronics Congress in Warsaw. Interesting contribution was delivered by A. S. Shcherbakov (Inst. Nac. Astrofisica Optica Electronica, Mexico).

In the *Session 5: Acousto-optics in Imaging* two invited papers were read by C. Glorieux (Kath. University Leuven, Belgium) on imaging of transient and periodic acoustic wave propagation from mili- to nanosecond timescales and by V.B. Voloshinov (Lomonosov Moscow State University, Russia) on AO processing of images in ultraviolet, visible and infrared regions of spectrum. Also valuable contribution on application of Bragg AO interaction for optical wave front visualization was presented by D. E. Kostyuk from the same University.

The *Session 6: Signal Processing and AO Devices* included invited paper by T. Poon (Virginia Polytechnic Institute and State University, USA) and T. Kim (Sejong University, South Korea) on acousto-optics with MATLAB as well as two contributions by V. V. Proklov *et al.* (Inst. Radio Engin. and Electronics, Moscow, Russia) on functional improvements of AO devices by means of preliminary dynamic signal predistortions and by S. Kim, K. H. Wagner (University of Colorado at Boulder, USA) on AO tunable filter using phased-array transducer for a spectrally multiplexed beamformer.

The last oral *Session 7: AO Devices and Spectrometers* consisted of five contribution papers: on guided-wave AO devices for space application by C. Ciminelli and M. N. Armenise (Politecnico di Bari, Italy), on AO tunable filters for infrared imaging by N. Gupta (Army Research Laboratory, USA), on double AO tunable filter spectral imaging system by V.I. Pustovoi *et al.*, (Scient. Technol. Cent. of Unique Instr.; A-Optic Ltd, Russia), on interconnection between the dynamic range and information capacity of AO devices by B. S. Gurevich *et al.* (Scient. Instrum. Co. St. Petersburg, Russia; Nat. Acad. Sci. of Kyrgistan, Kyrgistan) and on acoustics of the RF pulsed excited CO<sub>2</sub> laser discharge by D. Wojaczek, *et al.* (Wrocław University of Technology, Poland).

Also very interesting 8 contributions were presented in the Poster Session: one on PAS in infrared gas spectroscopy by V. Svedas *et al.* (Inst. Phys., Lithuania) and 7

on AO topics. These were: on a band-width imaging spectrometer based on AO tunable filters by J. Vila–Frances *et al.* (University de Valencia and University Jaume, Spain), on Bragg AO diffraction in biaxial media by A. Y. Tchernyatin (Lomonosov Moscow University, Russia), on observation of multi-wave non-colinear AO coupled states by A. S. Shcherbakov and A. Augire Lopez (Mexico) and on multi-fold scattering of light by elastic waves with direct transitions between all the optical modes by the same authors (Mexico), on surface characteristics study using AO tunable filter by B. S. Gurevich *et al.* (Russia and Kyrgyzstan), on visualization of back reflected acoustic waves in paratellurite single crystal by means of acousto-optics by O. Y. Makarov and V. B. Voloshinov (Lomonosov Moscow University, Russia), and on spectrograms correction problem in AO tunable filter spectroscopy by V. E. Pozhar and V. I. Pustovoi (Sci. Techn. Centre, Russia).

The AOPA as the topical conference, a part of the COO-SPIE Congress gave a good opportunity for specialists to meet again to discuss and to exchange their knowledge as well as to continue traditions of many Intern. Conferences organised in Europe and America in recent decade. The well known Spring Schools on Acousto-Optics and Applications (organised every tree years in Gdansk, Poland, since 1980), Advances in Acousto-Optics Symposia (every year since 1996 starting in Paris), International Conferences on Photoacoustic and Phothothermal Phenomena (since 1980-ties) or the every year Winter Workshops on Photoacoustics and Photothermics (organised by Silesian University in Beskidy Mountains every year since 1995) may be reminded to mark the tendency of intense developing of this branches of science and technology, Optoelectronics included.

The participants (there were 40–60 people as the audience during the Sessions of AOPA), created a good scientific and social atmosphere during the debates as well as attending in various additional events provided by the Congress Organisers. Also, they have possibility to make sightseeing of the city of Warsaw and its surroundings.

The information about the COO congress and AOPA conference can also be found in **Bulletin of SPIE Polish Chapter, Special Issue** on SPIE Intern. Congress on Optics and Optoelectronics, 28 August – 2 September 2005, Warsaw University of Technology.

**Abstracts** of papers presented at AOPA conference were published together with the **Technical Programme of the COO Congress, pages 112–119** and a majority of the papers presented at AOPA (as mentioned above) in the **SPIE Proceeding vol. 5953**.

*Antoni Śliwiński*  
Chairman of AOPA conference