

C H R O N I C L E

2-nd meeting on Advances in Acousto-Optics

St. Petersburg, Russia, June 24-25, 1997

After the successful 1-st meeting on AA-O'96 started as the 10-th Topical Meeting (1st one of the European Acousto-Optic Club) of the European Optical Society organized by Dr J. Sapriel (CNET - Bagneux) in Paris, the second meeting of that kind (AA-O'97) took place in St. Petersburg on 24-25-th June, 1997. It was organized by the European Optical Society, the St. Petersburg State Academy of Aerospace Instrumentation and the Institute of Radio Engineering and Electronics of Russian Academy of Science, Russia.

The Organizing Committee consisted of:

The **Conference Co-Chairs**: Prof. Yuri Gulayev (Institute of Radio Engineering and Electronics RAS, Russia) and Prof. Jacques Sapriel (Centre National d'Etudes des Telecommunications, France).

The **Executive Committee**:

Prof. S.V. Kulakov

Dr V.V. Molotok

both from the St. Petersburg State Academy of Aerospace Instrumentation, Russia and the **Programme Committee**:

Valery V. Proklov (Institute of Radio Engineering and Electronics RAS, Russia)

Vladislav I. Pustovoit (Institute of Radio Engineering and Electronics RAS, Russia)

Oswald Leroy (Katholieke Universiteit Leuven, Belgium)

Antoni Śliwiński (University of Gdańsk, Poland)

Mario Armenise (Politecnico di Bari, Italy)

Jean P. Huignard (Thomson, LCR, France)

Daniel Dolfi (Thomson, LCR, France)

Erik Blomme (Vrije Hogeschool voor Technologie en Informatica, Belgium)

Rudy Briers (Katholieke Universiteit Leuven, Belgium)

Victor V. Molotok (St. Petersburg State Academy of Aerospace Instrumentation, Russia).

The AA-O'97 Conference was sponsored by the Russian Fund of Fundamental Research and Ministry for Base and Special Education of Russia.

More than 60 participants from 6 countries of Europe gathered in the Hotel for Tourisme nearby the building of the State Academy of Aerospace Instrumentation for very topical conference on interaction of light and ultrasonics (including theoretical developments treated for a wide range of applications.

There were 7 oral sessions and 1 poster session in which 37 papers were presented.

Several papers were related to different problems of ultrasonic light diffraction taking into account many aspects of the phenomenon including mechanisms of light and ultrasonics interaction, polarization effects, interferometric measurements.

Papers grouped around application of acousto-optical devices to signal processing covered theoretical basis for the problem as well as many practical solutions for acousto-optical processors like analysers, filters, modulators etc.

Another group of papers concern application perspectives of acousto-optical devices in optical communication systems.

Some papers were devoted to holographic 3D image display or to recording and reproducing of wideband RF signals.

Also, there were papers on properties of acousto-optical materials and on acousto-optical devices metrology.

Most of the presentations were very interesting and of high level what was reflected in professional discussion after presentations as well as during the final discussion predicted in the programme.

During the meeting there was also discussion about some formal rules for the EAO (European Acousto-Optic Club). Dr Molotok presented a proposal prepared by Dr E. Blomme (Belgium) and a kind of a by-law of the EAAC reflecting the main objectives and purposes of the every year 2 days meeting of the A.O. community of Europe has been accepted. The role of the European Optical Society as the main sponsor and initiator of the meetings was evidently stressed. Also relations between AA-O's meetings and the every 3 years Spring Schools on Acoustooptics was discussed.

The participants decided that the next AA-O'98 and the 7th International Spring School on Acoustooptics will be organized as a joint meeting in Gdańsk-Jurata, May 18-22, 1998.

Antoni Śliwiński

WORLD CONGRESS ON ULTRASONICS'97

Jokohama, Japan, 24-27 August 1997

The WCU-97 was the second world meeting of ultrasonics community following the 1-st WCU-95 congress started in Berlin 2 years ago.

The **International Steering Committee** for the Congress representing different countries and acoustical societies has been following:

Chairman: **Noriyoshi Chubachi**, JAPAN

A. Alippi ITALY

E. Benes AUSTRIA

L. Bjørnø DENMARK

L. Crum USA

M. Deschamps FRANCE

J.A. Gallego-Juarez SPAIN

J. Herbertz GERMANY

H. Jones CANADA

O. Leroy BELGIUM

T.J. Mason UK

W.G. Mayer USA

W.G. Pace UK

R. Reibold GERMANY

A. Śliwiński POLAND

S. Ueha JAPAN

A. Zarembowitch FRANCE

The Chairman of the Organizing Committee was Prof. N. CHUBACHI from Tohoku Gakuin University, the V-ce Chairman: Prof. K. YAMANONCHI, Tohoku University and the Secretary: Prof. S. UEHA, Tokyo Institute of Technology, the President of the Acoustical Society of Japan. Prof. K. TAKAGI, University of Tokyo was the Chairman of the Program and the Editor of the Proceedings of WCU 97. The whole local Organizing Committee contained 109 members in 70% from universities and technological institutes and 30% from industrial companies.

The Congress was sponsored by Science and Technology Agency, Kanagawa Prefecture and City of Yokohama and financially supported by the City of Yokohama, by 4 science and technological foundations and 62 industrial corporations and companies.

More than 360 participants from 22 countries gathered at the Pacifico Yokohama congress centre situated at the Yokohama Bay for presentation of contributions and common discussion on advanced topics of ultrasonic science and technology. 260 original contribution papers, 4 invited papers and 1 plenary lecture were presented. Among the contribution papers 115 were oral presentations (20 minutes) in special fields sessions and 145 were short (about 2 minutes) – for oral presentations correlated with the poster sessions. In this way everyone of poster papers could be shortly introduced by their authors.

The papers covered the whole field of ultrasonics and were grouped in eleven following sessions: Basic Ultrasound (2 sessions), Ultrasonic Transduction and Materials (1 session), Photoacoustics and acousto-optics (2 sessions), Ultrasonic Measurement (2 sessions), Physical and Molecular Acoustics (2 sessions), Devices (3 sessions), Power Ultrasonic and Maters (4 sessions), Non-destructive Evaluation (1 session), Sonochemistry (2 sessions), Medical Ultrasonics (3 sessions) and Underwater Acoustics (2 sessions).

The only one plenary invited paper on "Safety of Medical Ultrasound" was presented by Professor J. HERBERTZ of Gerhard-Mercator Universität, Duisburg, Germany. The author presented his "perspective on safety issues of ultrasound in the field of therapy and surgery and in the fields of medical diagnosis and his vision of establishing a trustworthy safety classification for ultrasonic diagnostic equipment".

Three other invited papers were correlated with topical sessions.

Professor K. YAMANOCHI of Tohoku University, Japan, spoke on "Future trend of acoustic wave devices". He described several hot topics of acoustic wave technology important to investigate facing the coming 21 century requirements.

The main items to develop are:

- 1) high performore and high quality acoustic devices,
- 2) development and research of new piezoelectric materials and new theoretical analysis,
- 3) analysis of linear and non-linear propagation characteristics and new devices using new fundamental operation mechanism,
- 4) evaluation of materials using ultrasonic microscope,
- 5) ultrasonic motors and actuators,
- 6) high performance SAW devices in mobile communication,
- 7) piezoelectric gyroscope and SAW sensors,
- 8) high precise and high performance and high frequency ultrasonic medical diagnosis,
- 9) high precise time standard using ultrasonics.

Most of these items were examplified by up to date achievements in ultrasonic, acousto-electronic and acousto-optic technologies and in acoustic measurements and applications.

Professor R. APFEL of Yale University, USA talked about "Super oscillations of drops and surfactant studies in microgravity". He presented results of a wide programme which combined experimental work performed both on the ground and in space and theoretical and numerical modeling of the drop behaviour oscilations and the influence of the surfactant on them. There has been possible to establish idealized conditions for surface behaviour studies by levitating a drop of liquid in air, away from interacting of container wall surfaces, and manipulating the drop with acoustic radiation forces. Different free oscillations of initially deformed drops were studied and the influence of surfactants on these oscilations reflected in dynamic surface tension and the surface viscosities (shear and dilatational) were observed and determined.

The next invited paper was presented by Professor J.A. GALLEGO-JUÁRES of Consejo Superior de Investigaciones Cientificas, Spain, on "Power ultrasonic technologies for industrial applications". He described the structure and performance of the new sonic/ultrasonic power generator constituted by a transducer with a flexural-vibrating plate radiator and an electronic unit for driving the transducer. The prototypes of generators were developed for the frequency range 10–40 kHz and power capacities between 100 W and 1 kW. 3 kW new model of 1 meter radiating plate is being constructed, presently. Several examples of industrial applications like fine particle removal from industrial fumes, defoaning, food dehydration and cleaning of textiles were described.

It is impossible to talk over many very interesting contributed and poster papers among those presented in the congress. The majority of papers presented have a good level and illustrated topical achievements of ultrasonics in science technology medicine and industry.

In parallel to sessions the ultrasonic equipment exhibition of 12 exhibitors mainly from Japan was very succeeded.

During the Congress there was a special competition on the best poster evaluation organized. Participants voted (using the ballot box) and 5 posters were selected and awarded by the Organizing Committee. Among them one Polish poster presented by E. Kotlicka from the Technical University of Warsaw was distinguished.

The participants as well as accompanied persons had many opportunities for sightseeing and experiencing the Japanese customs and culture. A special events were prepared nearby the lecture rooms: the flower arrangement (Ikebana), Kimono (Japanese traditional clothes), tea ceremony (Cha) and Koto music, calligraphy (Shodo) and colored paper folding (Origami) in which taking part one can enjoy very much.

The participants had opportunity to attend interesting post Congress technical tours. One of them was the tour to the Seidensha Electronics Co., Ltd. and the Tokyo Institute of Technology Lab. in which the undersigned below took part. There was a possibility to visit the factory producing ultrasonic and electromagnetic welding equipment of wide field of applications. In the Tokyo Institute of Technology, in the Precision and Intelligence Laboratory, the group was hosted by Professor Sadayuki Ueha, the head of the Applied Acoustic Devices Section. Many interesting experiments are carried on in this Laboratory. The current topics are: fundamentals of ultrasonics applied in various engineering fields, ultrasonic actuators and motors and ultrasonic measurements. Several kinds of hybrid transducer tipe ultrasonic motors, the noncontact transportation system using acoustic radiation pressure, ultrasonic diagnosis of osteoporosis system and others, were demonstrated to the visitors. At the end of the visit a very warm reception (barbecue party) took place.

The undersigned below having the opportunity to write this report wants to express his cordial thanks to Professor S. Ueha for his kind invitation to Japan and the essential support enabling him to participate the Congress.

The 2-nd World Congress on Ultrasonics in Jokohama, similarly as the 1st one in Berlin has occured very succesfull and fruitful. The Steering Committee of WCU's during its meeting in Jokohama declined with thanks to the Organizers for their great efforts and the excellent organization. Also, the Steering Committee discussed and accepted the By-Law for World Congress on Ultrasonics. It has been decided that the next WCU-99 meeting joint with Ultrasonic International 99 Conference will take place in Copenhagen, Denmark and will be organized by Prof. L. Bjørnø.

Antoni Śliwiński

103rd AES Convention, New York

26–29 September 1997

This Convention was a Jubilee of fifty years unbroken tradition of AES Conventions. “AES goes gold” – this sentence was visible from numerous green posters, which marked organizers’ stands in the huge indoor volume of the New York Javits Center, where the 103rd Convention was located. The Javits Center, stretches along the Hudson River on Manhattans west-side, near to the entrance to the famous Lincoln Tunnel, linking Manhattan with New Jersey. The Center is very large, one can say, too large in comparison with other convention sites. It is enough to say that the building contains over 167000 square meter (1.8 million square feet) of floor space, thus walking among various stands, lecture halls, meeting rooms and hundreds of exhibition booths was somewhat tiring.

The opening ceremony was devoted to celebrate and emphasize the AES Gold Jubilee. Traditional AES awards were presented during the special ceremony, to acknowledge the contributions of those individuals who have furthered the advancement of the audio domain and the development of the Society. This year the awards were more numerous than previously due to the Jubilee occasion. An informal reception with a buffet completed the opening ceremony creating for the recipients of awards together with all invited guests, a relaxed atmosphere and an opportunity for individual meetings and exchange of ideas.

The scientific part of the Convention consisted, first of all, of the 16 paper sessions, each of them devoted to a specific domain of audio engineering. 142 papers were presented by 270 authors and co-authors from 18 countries (USA – 96, UK – 50, Japan – 27, Germany – 19, Finland – 11, Italy – 11, The Netherlands – 11, France – 10, Canada – 7, Denmark – 6, Austria – 5, Korea – 4, Russia – 3, Uruguay – 3, Israel – 2, Poland – 2, Spain – 2, Switzerland – 1). Besides of the paper sessions mentioned, the 16 workshop sessions, devoted to most actual topics, were organized and held parallel to paper sessions.

As usual, most of the papers were edited as Preprints prior to the debates, which helped presentations and efficient discussions after presentations. Moreover, this year, for the first time, all Preprints have been edited as a set in the form of a CD-ROM-disc, sold to attendees.

It is difficult to compare the scientific achievements presented during this Convention with those of previous ones. It is easier to assess its commercial impact. The approximate number of 18000 visitors to the exhibition area means an undoubted advertising success of all the 348 companies of the audio industry all over the world, participating in this gigantic fair.

Besides the scientific and industrial importance, the Convention played a significant organizational role. The Board of Governors meeting, held traditionally the day after the closing of the Convention, was, as usual, an important event of the entire AES

annual activity. The meeting preceeded the date of 6 October, being the terminal point of passing organizational functions from those ending their term to those elected for the next term. The actual President, Elizabeth Cohen, presided the meeting for the last time, thus future meetings will be presided by the President-elect Subir Pramanik. Other AES officers will also be changed according to bylaws. Among other things I delivered the final report of my activities as Vice-President for the Central Europe Region.

In my report I quoted as main achievements the six new AES Sections which I successfully coorganized within the Region: Lithuanian, Russian-St.Petersburg, Russian-Baltic State Technical University-Student, Gdansk Technical University-Student, Ukrainian, Byelorussian. Thus the total number of Sections within the CE Region increased to seventeen, while above three hundred new members entered into AES community. This creates a new organizational situation in Central and Eastern Europe facilitating professional contacts among sound engineers working in the neighbouring countries. Regional AES meetings become desirable and just such initiative was undertaken, proposed to the Board of Governors and preliminarily accepted. The initiative was undertaken by the St. Petersburg Section which will organize a regional conference in 1999.

Other decisions were also undertaken by the BoG meeting, namely, those concerning future AES Conventions. The nearest one, the 104th, will take place in Amsterdam, from May 16-19,1998, and the next one, the 105th, in San Francisco, from September 26-29, 1998.

From my experience during functioning as AES officer, I would like to formulate a final concise conclusion and advice. The national AES Sections, especially in the countries undergoing transformation from centrally controlled to the democratic system of social life, are of great value as a substantial relief and help for introducing acousticians, sound engineers and other related professional local communities into a world wide area, of scientific, professional and commercial contacts. Those possibilities, offered to local Sections by the AES must not be overlooked. Now, the future activities of the AES Central Region will be coordinated by the new Vice-President for the CE Region, Dr Karl-Otto Baeder from Switzerland. I wish him the most successful term leading to the further fruitful development of our Region.

I think, moreover, that the above mentioned Sections of Central and Eastern Europe should be grateful to those long-sighted AES officers, who seven years ago decided to extend the Europe AES Region to the East and offer substantial help in organizing new Sections. The Audio Engineering Society may be proud of the fulfilment of one of its major aims.

Marianna Sankiewicz

DISSERTATION

"Investigations of inclusion complexes of organic ions with α - and β -cyclodextrin by means of ultrasonic spectroscopy methods" Andrzej Balcerzak, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw. Ph.D. Thesis in material science, supervised by Associate Professor Adam Juszkiwicz.

The aim of the Thesis was to obtain thermodynamic and kinetic characteristics of complexation process, information about its mechanism, and to determine the influence of different parameters (sterical, chemical) on this process.

Measurements of the absorption of ultrasonic waves in the frequency range 1 – 150 MHz were carried out for aqueous solutions of α - and β -cyclodextrin with surfactants which were the source of organic ions. The additional measurements of velocity of the acoustical wave and density were also made. All these measurements were made for the equimolar solutions of cyclodextrin + surfactant at 15, 25, 35 and 45° C. The concentrations were equal to 0.01 – 0.04 M and 0.01 M for solutions with α -cyclodextrin and β -cyclodextrin (due to its low solubility), respectively.

The measurements were made by means of the resonator (1 – 10 MHz) and pulse (10 – 150 MHz) methods.

The most important results:

- there are ultrasonic relaxation processes in the aqueous solutions of α - and β -cyclodextrin with surfactants; these processes can be described by one or two relaxation times,
- each of these processes fulfils the scheme of first-order or pseudo-first-order reaction,
- the calculated kinetic and thermodynamic parameters enable to attribute molecular phenomena to the observed relaxation processes,
- the low-frequency process is connected with the exchange of water molecules in hydration shell of cyclodextrin,
- the high-frequency process, which occurs for organic ions with long alkyl chains, is connected with penetration of the chain of the organic ion to the cavity of cyclodextrin,
- a kind of the hydrophilic group of the surfactant has diminutive influence on this penetration,
- the experimental results are explained by the proposed three-step kinetic model of complexation.