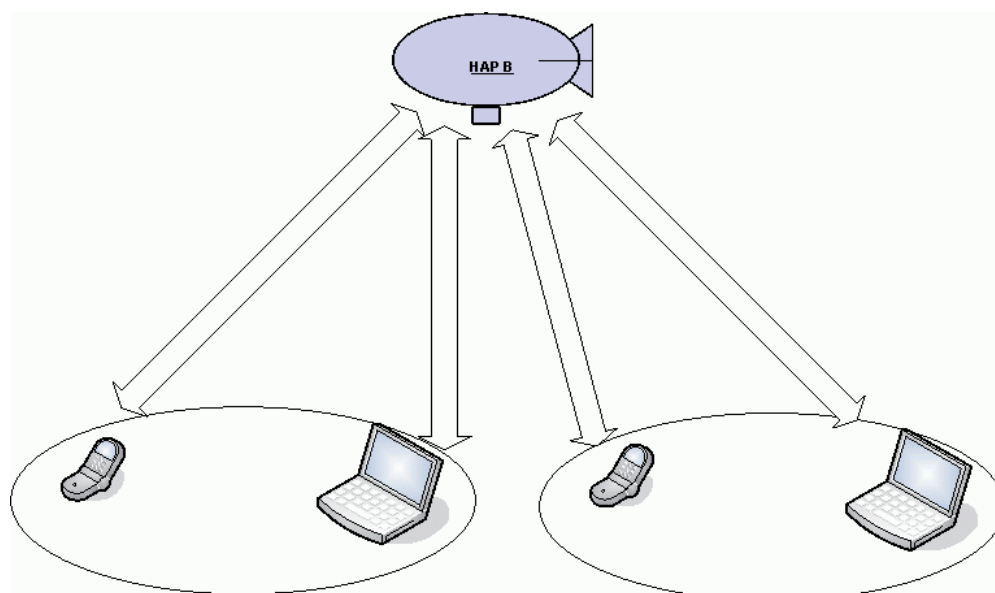
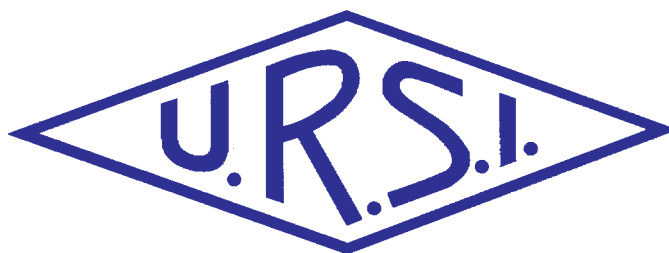


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2010 INTERNATIONAL KHARKOV SYMPOSIUM ON PHYSICS AND ENGINEERING OF MICROWAVES, MILLIMETER AND SUBMILLIMETER WAVES (MSMW'2010) AND WORKSHOP ON TERAHERTZ TECHNOLOGIES AND SPECTROSCOPY OF COMPLEX MEDIA (TERATECH'2010)

V. N. Karazin Kharkov National University, Ukraine, June 21 - 26, 2010

Abstract

MSMW'2010 Symposium took place at the V. N. Karazin Kharkov National University, Ukraine on June 21-26, 2010. It was organized by the Scientific Council of the National Academy of Sciences of Ukraine (NASU) on Radio-Physics and Microwave Electronics, in co-operation with the following organizations: A. Usikov Institute of Radiophysics and Electronics of NAS of Ukraine (IRE NASU), Institute of Radio Astronomy of NAS of Ukraine (IRA NASU), V. Karazin Kharkov National University (KhNU), Kharkov National University of Radio Electronics (KhNURE), Institute of Magnetism of NAS and MES of Ukraine (IMAG NASU and MESU), Young Scientists Council of IRENASU, IEEE AP/MTT/ED/AES/GRS/NPS/EMB Societies East Ukraine Joint Chapter, IEEE "IRE-Kharkov" Student Branch, IEEE "IRE-Kharkov MTT-S" Student Chapter, IEEE "IRE-Kharkov ED-S" Student Chapter and the National URSI Committee of Ukraine. It was technically co-sponsored by: URSI Commissions B and K, IEEE AP/MTT/ED/AES/GRS/NPS/EMB Societies East Ukraine Joint Chapter and sponsored by IEEE AP, MTT, ED, and NPS Societies, IEEE Electron Devices Society, URSI Commission and the European Microwave Association (EuMA).

The working days of the Symposium were June 22 to 25. Every day the program started with a plenary session of five 35-min invited lectures in a large auditorium. After

that, four or three parallel day-long sessions of 15-min contributed papers had been working. The working language of the Symposium was English. June 26 was filled in with social events. The number of registered participants was 166 including 110 from Kharkov, 15 from the rest of Ukraine, 15 from Russia, 5 from Germany, 4 from Mexico, 3 from Turkey, 2 from France, China, Iran, and Lithuania each, 1 from USA, the United Kingdom, Sweden, Japan, Israel, and Belarus each, and also from Canada, Czech Republic, India. The total number of papers presented during the Symposium was about 212, included 28 invited ones.

CD-ROM version of the MSMW'2010 Proceedings had been prepared before the Symposium. MSMW'2010 Symposium program contains papers submitted world-known experts in microwaves and shorter wavelength science and technology, so participation in the Symposium has become a unique experience to Ukrainian participants. The holding of the Symposium became possible thanks to the support of sponsors: URSI, IEEE AP, MTT, ED, and NPS Societies as well as efforts of the traditional founders and organizers of MSMW. The European Microwave Association has donated a special grant for the funding of the EuMA-MSMW Microwave Prizes awarded to the young scientists who presented outstanding papers during the Symposium.

As three years ago, on the MSMW'07, this year the Workshop on Terahertz Technologies and Spectroscopy of Complex Media (TERATECH'10) was organized in the



Figure 1. The opening ceremony of the MSMW'2010 Symposium. From left to right: Dr. A. V. Boriskin (IRE NASU, Kharkov), Prof. Ni. I. Slipchenko (KhNURE), Prof. S. N. Shulga (KhNU), Prof. L. M. Lytvynenko (IRA NASU, Kharkov), Prof. V. M. Yakovenko (IRE NASU, Kharkov), Prof. A. N. Pogorily (IMAG NASU and MESU), Prof. S. I. Tarapov, Dr. A. A. Kostenko, Prof. A. I. Nosich (IRE NASU, Kharkov)



Figure 2. Poster session. From left to right: Prof. L. P. Yatsuk (KhNU, Kharkov), Dr. V. V. Yachin (IRA NASU, Kharkov), Dr. T. L. Zinenko (IRE NASU, Kharkov)

framework of the MSMW'2010 Symposium in the format of a special two-day session. We strongly hope that it will have remarkable impact on the on-going and future R&D in this novel area. This is fully in line with traditionally strong emphasis placed by MSMW program on the mm and sub-mm wave physics and technology. Extremely captivating and challenging area of nanophysics and nanoelectronics, considered as the key technology of the current century, has been also included into the agenda of the workshop.

Also, were organized IEEE Chapter Chair Conference, IEEE ED Society Mini-Colloquium, and the 10-th Kharkov Young Scientists Conference (YSC*10) "Electromagnetics, Photonics, and Biophysics" in the framework of the MSMW'2010 Symposium.

MSMW'2010 started at 9:00 on June 22, 2010 by the opening ceremony at the "Large Chemical" auditorium of the Kharkov National University. The first to address the participants was MSMW'2010 Chairman, Director of IRE NASU, Vice-Chairman of the Ukrainian National URSI Committee Prof. Vladimir M. Yakovenko. He was followed by the welcome words from the other organizations behind MSMW'2010: Head of the Department of Thin Films Physics of IMAG NASU and MESU Prof. Anatolii N. Pogorily, Dean of the School of Radio Physics of KhNU Prof. Sergei N. Shulga and Vice-Rector of KhNU Prof. Nikolai I. Slipchenko. The next to make a welcoming speech was MSMW'2010 Co-Organizer Prof. Alexander I. Nosich of IRE NASU, who spoke in the name of the IEEE AP/MTT/ED/AES/GRS/NPS/EMB Societies East Ukraine Joint Chapter.

At the first morning a plenary session was held, consisting of five invited talks:

Development Of Powerful Terahertz Gyrotrons, M. Glyavin, A. Luchinin, V. Manuilov, M. Moiseev, A. Sedov, V. Zapevalov. Nizhny Novgorod, Russia
260 Ghz Quasioptical Setup For Epr And Dnp Experiments On The 9.2 Tesla Dnp/Nmr/Epr Spectrometer, V. Denysenkov, V. K. Kiseliov, M.

Prandolini, M. Gafurov, A. Krahn, F. Engelke, V. I. Bezborodov, Ye. M. Kuleshov, P. K. Nesterov, M. S. Yanovsky, T. F. Prisner. Kharkov, Ukraine; Frankfurt am Main, Rheinstetten, Germany

Microwave Emission Properties Of A Precipitating Atmosphere With Respect To Remote Sensing Of Precipitation From Space By Means Of Microwave Radiometry, B. G. Kutuza, Moscow, Russia

Measurement Of Dielectric Properties Of Liquid Crystals In The Millimeter And Thz Ranges, V. V. Meriakri, E. E. Chigray, I. P. Nikitin., L. C. Pan, R. P. Pan, M. P. Parkhomenko. Fryazino, Russia; Hsinchu, Taiwan

Sources Of Intense Impulse Microwave Emission, I. I. Magda, Kharkov, Ukraine.

After the lunch, the symposium continued working with four simultaneous sessions:

Session W. Workshop on Terahertz Technologies and Spectroscopy of Complex Media.

Session A. Electromagnetic Theory and Numerical Simulation.

Session C. Wave propagation, Radar, Remote Sensing and Signal Processing.

Session G. Scientific, Industrial and Biomedical Applications.

In session W the following invited papers were presented:

High Power Thz Technologies Opened By High Power Radiation Sources – Gyrotrons, T. Idehara, T. Saito, I. Ogawa, S. Mitsudo, Y. Tatematsu, Fukui, Japan
Anderson Localization in Metamaterials, N. M. Makarov, F. M. Izrailev, E. J. Torres-Herrera, Puebla, Mexico

In session A the following invited paper was presented:

Resonant Radiation Of Electron Beam, Moving Near Periodic Boundary Of Metamaterial, P. Melezhik, A. Poyedinchuk, N. P. Yashina, G. Granet, Kharkov, Ukraine; Clermont-Ferrand, France

After the sessions, all the participants were invited to enjoy the concert provided by Ukrainian *folk instruments* Ensemble "Vesela Banda" of the I. Kotlyarevsky Kharkov State University of Arts. Later that evening, at 8:00 p.m., a welcome party was organized at the university restaurant. At the welcome party, Ukrainian sparkling wine was served. This event created a perfect atmosphere to relax and shake off the troubles of long and sometimes tiring journeys that participants had to undertake to reach MSMW'2010.

At the plenary session on June 23, the following invited papers were presented:

Electromagnetic Analysis Of Lamellar Diffraction Gratings Using A Spectral Method Based On Spline Expansion With A Non Uniform Sampling Scheme, A. M. Armeanu, L. B. Andriamanampisoa, K. Edee, G. Granet, P. Schiavone, Aubiire, France

Trapped Mode Resonances Of Metal-Dielectric Arrays, S. L. Prosvirnin, A. V. Gribovsky, V. V. Khardikov, P. L. Mladyonov, E. O. Iarko, Kharkov, Ukraine

Resonance Responses Of Compound Screens With Below-Cutoff Holes And Eigenoscillation Intercoupling As Its Forward Base, A. O. Perov, N. G. Kolmakova, A. A. Kirilenko, Kharkov, Ukraine

Algan/Gan Microwave Transistors For Wireless Communication Systems And Advanced Nanostructures For High-Speed Sensor Applications, S. Vitusevich, Juelich, Germany

Stochastic Scattering Due To Random Inhomogeneities In Shf Oscillation Systems, E. M. Ganapolskii, Z. E. Eremenko, Yu. V. Tarasov, Kharkov, Ukraine

That day regular sessions of contributed papers consisted of:

Session W. Workshop on Terahertz Technologies and Spectroscopy of Complex Media.

Session B. Microwave solid State Physics and Applications

Session F. Radio Astronomy and Earth's Environment Study

In session B the following invited papers were presented:

Josephson Waveform Synthesizers, J. Niemeyer, O. Kieler, F. Müller, J. Kohlmann, R. Behr, L. Palafox, Braunschweig, Germany

Microwave Study Of Fese_{0.3}Te_{0.7} Thin Film By Te_{0.11}-Mode Sapphire Dielectric Resonator, Yun Wu, Shuyu Zhou, Xiyuan Wang, Lixin Cao, Xueqiang Zhang, Yusheng He, A. A. Barannik, N. T. Cherpak, V. N. Skresanov, Beijing, China; Kharkov, Ukraine

Superconducting Gap Structure Of Iron Pnictides From Radiofrequency Penetration Depth And Thermal Conductivity, M. A. Tanatar, D. C. Canfield, R. Prozorov, Ames, USA

In session F the following invited papers were presented:

Influence Of Hf Powerful Radio Waves On The Ozone Number Density In The Earth's Atmosphere, Yu. Yu. Kulikov, V. L. Frolov, Nizhny Novgorod, Russia

The Use Of Precise Spectroscopy For Detailed Studies Of Star Forming Regions And Fundamental Properties Of The Universe, A. V. Lapinov, Nizhny Novgorod, Russia

On this day, a bus city tour was organized, enabling participants to get acquainted with the history of Kharkiv, the second-largest Ukrainian city. Remarkable historical buildings and monuments, such as the Assumption Cathedral, WWII Memorials, and the "Gosprom" complex built in the 1920s in the constructivism style of the early Soviet period were visited.

On the third day, the plenary session looked as follows:

System Aspects Of A Low-Cost Coherent Radar System With Aesa Antenna For Maritime Applications, T. Bertuch, M. Pamies, C. Löcker, P. Knott,



Figure 3. MSMW'2010 Banquet. From left to right: Dr. A. A. Kostenko (IRE NASU, Kharkov), Prof. A. N. Vystavkin and Dr. S. V. Shitov (V. A. Kotelnikov Institute of Radio Engineering and Electronics of RAS, Moscow, Russia)

H. Erkens, R. Wunderlich, S. Heinen, Wachtberg, Germany

Lasers With Free Nonrelativistic Electrons, V. A. Buts, A. M. Egorov, Kharkov, Ukraine

Reliability, Degradation And Breakdown Of Advanced Gate Stacks, E. Miranda, Barcelona Spain

Nanocrystalline Silicon Thin Film Transistors. A. Nathan, London, United Kingdom

Two parallel sessions of regular papers that day went along the following topics:

Session E. Microwave and mm wave engineering.

Session H. R-functions, atomic functions, wavelets, fractals.

During those sessions the following invited papers were presented:

Characteristics Of The Waveguide To Quasioptical Or Dielectric Resonator Couplings, V. N. Skresanov, V. V. Glamazdin, M. P. Natarov, A. I. Shubny, Kharkov, Ukraine

Reconstruction And Super-Resolution Algorithms Of 2D-3D Images And Objects, V. I. Ponomaryov, Mexico-city, Mexico

That evening, the Symposium banquet was held at the university restaurant. This was a lovely event accompanied with live music, dancing and informal speeches. The dominant tone, however, was the joy of meeting the old friends and colleagues and making new ones.

On June 25, the following invited topics were presented:

Microwave And Thz Applications Of Ferroelectrics And Multiferroics, S. Gevorgian, A. Vorobiev, Moelndal, Sweden

Two Terminal And Multiterminal Efficient Planar Silicon Light Emitting Devices (Si-Led's) Fabricated By Standard Ic Technology As Components For All Silicon Monolithic Integrated Optoelectronic Systems, Herzl Aharoni, Beer-Sheva, Israel

New Measurement Method For Two-Port Noise



Figure 4. The closing ceremony of MSMW'2010: Prof. V. M. Yakovenko congratulates Dr. V. A. Sydoruk (Institute of Bio- und Nanosystems, Forschungszentrum Juelich, Germany) with successful presentation on the Symposium. On the right – Dr. O. V. Shramkova

Parameters, D. Pasquet, C. Andrei, D. Lesénéchal, P. Descamps, Caen, France

Fifty Years of Noise Radar, K.A. Lukin, R.M. Narayanan, Kharkov, Ukraine; Pennsylvania, USA

On the last working day, the symposium continued working with only one session:

Session D. Vacuum and solid state devices & IEEE EDS Mini-Colloquium

The closing ceremony of MSMW'2010 took place in the "Large Physical Auditorium" of KhNU at 15:00. At first, the winners of the Young Scientist Paper Contest were announced and awarded with the EuMA-MSMW prizes and certificates. This year the European Microwave Association established a 1000 Euro fund to be awarded to the winners of the Young Scientist Paper Contest. They were divided into 6 prizes: one First Prize, two second prizes, and three third prizes. The International Awards Jury consisted of 9 members: G. Granet, Aubiure, France, T. Idehara, Fukui, Japan, B. G. Kutuza, Moscow, Russia, S. Vitusevich, Juelich, Germany, A. I. Nosich, N. T. Cherpak, O. V. Shramkova, and D.M. Vavriv, Kharkov, Ukraine, and F. I. Yanovsky, Kiev; Ukraine.

The First Prize was awarded to:

Nikolay I. Avtomonov, Mechanisms Of Oscillations Excitation In The Spatial-Harmonic Magnetron With Cold Secondary-Emission Cathode Ira Nasu, Kharkov, Ukraine.

Two Second Prizes were awarded to:

Vitaly S. Bulygin, Visibility Of A Spherical Disk Illuminated By A Plane Wave Under The Grazing Incident, Khnu, Kharkov, Ukraine

Vyacheslav L. Semenenko, Parametric Instability Of Mobile Elastic Gate In Tera- And Nano- High Electron

Mobility Transistor, Moscow Institute Of Physics And Technology (State University), Moscow, Russia

Three Third Prizes were awarded to

Sergey A. Prikolotin, Spectral Characteristics Of Step-Bended Bar In A Rectangular Waveguide, Ire Nasu, Kharkov, Ukraine

Vadim V. Vashchenko, On Mathematical Modeling Of A Triangular Building Block In The Analysis Of E-Plane Waveguide Structures, Zaporizhzhya National Technical University, Zaporizhzhya, Ukraine

Sergey V. Nedukh, Magnetoresonance Features Of Strontium-Doped Lanthanum Manganites-Perovskites In Microwave Band, Ire Nasu, Kharkov, Ukraine

Besides, 5 Honorary Mentions were awarded for the "Next to the best papers":

Evgeny A. Gurnevich, The Possibility Of Cherenkov Radiation Generation In A Photonic Crystal Formed By Parallel Metallic Threads, Research Institute For Nuclear Problems, Belarus

Anna M. Linkova, Double Frequency Sounding Of Liquid Precipitation, Ire Nasu, Kharkov, Ukraine

Dmitry V. Churikov, Analytical Kravchenko Wavelets In The Digital Uwb Signal PROCESSING, Kotel'nikov Institute of Radio Engineering and Electronics of RAS, Moscow, Russia

Evgeny A. Serov, Atmosphere Continuum Absorption Investigation At Mm Waves, Institute Of Applied Physics Russian Academy Of Science, Nizhny Novgorod, Russia

Olga V. Shapoval, Backscattering From Thin Magneto-Dielectric Strips At The Edge-On Incidence Of The H-Polarized Plane Wave, Ire Nasu, Kharkov, Ukraine

The colorful certificates of the EuMA-MSMW Prizes, signed by Dr. Oksana V. Shramkova, Ukrainian Delegate at

the European Microwave Association and Prof. Vladimir M. Yakovenko, MSMW'2010 Chairman, were handed to the winners.

Additionally, another Young Scientist Award was granted by the IEEE East Ukraine Joint Chapter for the best poster paper presented at the symposium. It consisted of certificate and 100 USD money prize. This award was given to

Hossein Farhang, Optimization Of An X-Band Twta Using Magic Pic-FDTD Code, Microwave Tubes Laboratory, Moghtader Tech Co., Tehran, Iran

The final closing address was done by Prof. Vladimir M. Yakovenko. He announced that the next Symposium, MSMW'2013, will be held again in Kharkov in June, 2013, thanked the participants and organizers for creating unprecedented forum for scientific discussions, and expressed a hope that the MSMW Symposia series will be continued. He also expressed gratitude to international

institutions such as IEEE, URSI, EuMA, which rendered valuable and timely support.

In the weekend following this Symposium, the participants were proposed a social program in order to relax after four days of intensive work and strengthen the links originated at the Symposium. On Saturday, June 26 a full-day field trip with refreshments was organized from Kharkov to the S. Braude Radio Astronomy Observatory of the IRA NAS of Ukraine. The observatory is located about 80 km southwards from Kharkov. It operates the world-largest decameter-wavelength radio telescope involved into international research programs including the investigations of solar activity, Jupiter magnetic field and others. Nice weather and hospitality of the hosts helped finish the symposium agenda.

Prof. Vladimir M. Yakovenko
MSMW'2010 Chairman