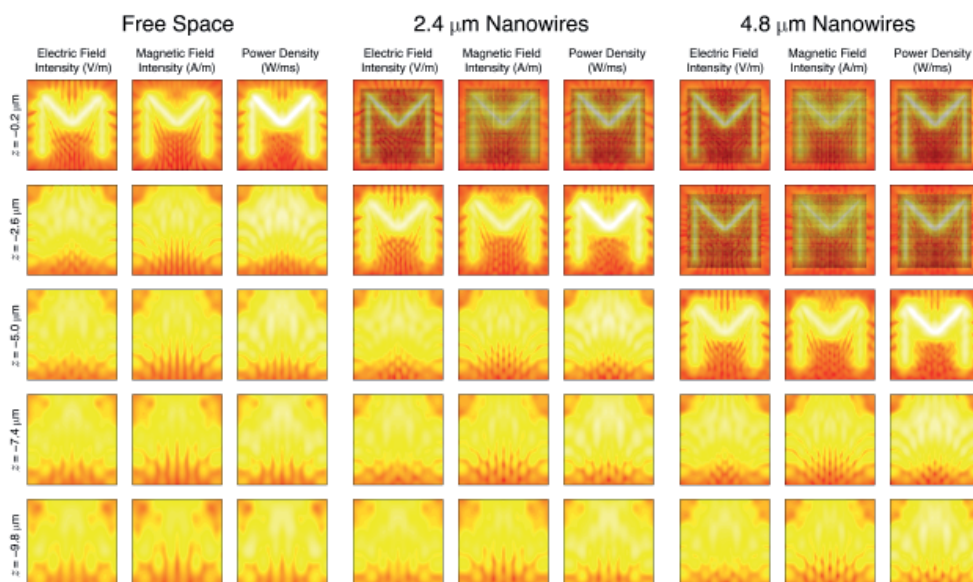
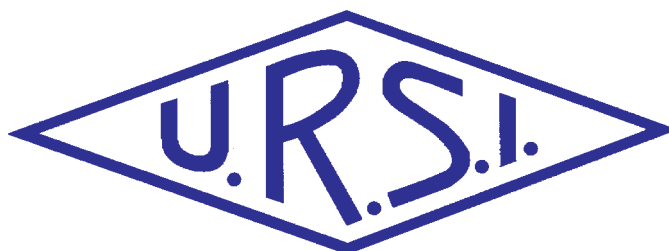


INTERNATIONAL
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RADIO SCIENCE

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INTERNATIONALE



No 359
December 2016

9th International Kharkiv Symposium on Physics and Engineering of Microwaves, Millimeter, and Submillimeter Waves (MSMW'2016)

The MSMW'2016 symposium took place at V. N. Karazin Kharkiv National University, Ukraine, on June 21-24, 2016 (www.msmw.org.ua). It was organized by the Scientific Council of the National Academy of Sciences of Ukraine (NASU) on Radio-Physics and Microwave Electronics, in cooperation with the following organizations: O. Ya. Usikov Institute for Radiophysics and Electronics of the National Academy of Sciences of Ukraine (IRE NASU); Scientific Council of the National Academy of Sciences of Ukraine on Radio-Physics and Microwave Electronics; Institute of Radio Astronomy of the National Academy of Sciences of Ukraine (IRA NASU); V. N. Karazin Kharkiv National University (KhNU); Kharkiv National University of Radioelectronics (KhNURE); Institute of Magnetism of NAS and MES of Ukraine (IM NASU); IEEE AES/AP/ED/EMB/GRS/MTT/NPS Societies East Ukraine Joint Chapter; European Microwave Association; and the International Union of Radio Science.

Technical cosponsors were the IEEE AES/AP/ED/EMB/GRS/MTT/NPS Societies East Ukraine Joint Chapter, the IEEE Ukraine Section, the European Microwave Association (EuMA), and the International Union of Radio Science.

The working days of the symposium were from June 21 to 24. Every day, the program started with a plenary session, where several invited lectures were presented. After that, three parallel sessions with contributed papers were held. The working language of the symposium was English. All

symposium days contained social events. The number of registered participants was 175, including 157 scientists from Ukraine and 18 scientists from abroad (Turkey, Japan, Poland, Italy, USA, Mexico, Russia, Belarus, and South Africa). The total number of papers presented during the symposium was 215, including 21 invited talks.

The MSMW'2016 Proceedings were prepared in CD-ROM format. The program of the symposium contained papers submitted by world-known experts in microwaves and shorter-wavelength science and technology.

The organizers thank the IEEE AES/AP/ED/EMB/GRS/MTT/NPS Societies East Ukraine Joint Chapter and the European Microwave Association (EuMA) for contributing to the symposium. The European Microwave Association provided a special grant for awards to the young scientists for the best presentations during the symposium.

June 21

The symposium started on June 21, 2016, with the opening ceremony (Figure 1). It began with the welcoming speech of Prof. Petr N. Melezhik, the MSMW'2016 Chair, Director of IRE NASU (Figure 2), Vice Chair of the Ukrainian National URSI Committee, and associate member of NASU. The second to address the participants was Prof. Valeri M. Shulga, Deputy Director of IRA



Figure 1. The MSMW'2016 opening ceremony.



Figure 2. Welcoming words from the symposium Chair, Prof. Petr N. Melezhik.



Figure 3. Prof. Toshitaka Idehara telling about high-power THz technologies.

NASU, Academician of NASU. He was followed by Prof. Sergiy M. Shulga, Dean of the School of Radiophysics, Biomedical Electronics, and Computer Systems of KhNU. Prof. Nickolay T. Cherpak (IRE NASU), Chair of the IEEE AP/MTT/ED/AES/GRS/NPS Societies East Ukraine Joint Chapter, concluded the opening ceremony with his speech.

The first morning plenary session consisted of the following invited talks:

“High-Power THz Technologies Opened by High-Frequency Gyration Covering Sub-THz to THz Region,” T. Idehara, A. Kuleshov, E. Khutoryan, Y. Tatematsu, Y. Matsuki, T. Fujiwara, S. Asai, T. Suehara, T. Yamazaki, A. Miyazaki Fukui (Figure 3)

“Inverse Problems of Electromagnetic Sounding: Gradient Medium and Periodic Boundary” N. Yashina, A. Brovenko, P. Melezhik, A. Poyedinchuk, A. Vertiy

“Ground-Based Millimeter-Wave Ozone Monitoring in Moscow During Sudden Stratospheric Warmings” S. Rozanov, E. Kropotkina, S. Solomonov, A. Ignatyev, A. Lukin

“High-Frequency Methods for Applied Problems of Electromagnetic Wave Scattering” O. Sukharevsky, V. Vasilets, S. Nechitailo, G. Khlopov



Figure 5. The symposium session, “Scientific, Industrial, and Biomedical Applications.”



Figure 4. Prof. Oleg Drobakhin and Dr. Nataliya Yashina discussed techniques for measuring reflectivity in the microwave range.

“Techniques of Measuring Reflectance in Free Space in the Microwave Range”

O. Drobakhin, M. Andreev, D. Saltykov (Figure 4)

The Symposium continued with three parallel sessions, after lunchtime: Session A. “Scientific, Industrial, and Biomedical Applications” (Figure 5); Session B. “Radio Astronomy and Earth’s Environment Study” (Figure 6); and Session C. “Vacuum Electronics” (Figure 7). The following invited papers were presented in Session C:

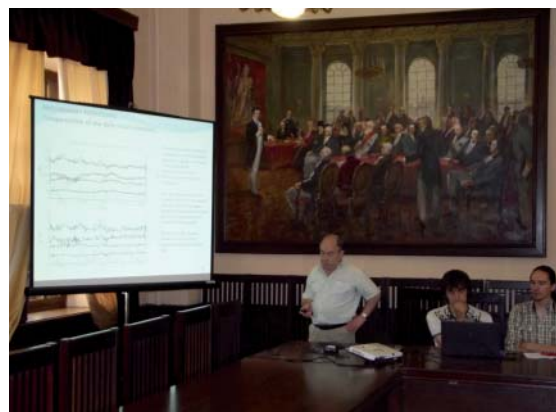


Figure 6. The symposium session, “Radio Astronomy and Earth’s Environment Study.”



Figure 7. The symposium session, “Vacuum Electronics.”



Figure 8. The symposium's welcome party.

"The Qualitative Theory of Electron Beam Formation in a Surface Wave Magnetron"
G. Churyumov

"Spatial-Harmonic Magnetrons with Cold Secondary-Emission Cathode: Advances and Challenges"
D. Vavriv, V. Naumenko, K. Schünemann

The symposium's welcome party was organized at the university restaurant at 6:30 p.m. It gave the participants a perfect opportunity to converse in a friendly casual atmosphere (Figure 8).

June 22

The second day of the symposium started with a plenary session with the following invited talks:

"Resonant All-Dielectric Planar Metamaterials"
V. Khardikov, S. Mizrakhy, V. Tuz, S. Prosvirnin

"Diffraction of the THZ Radiation at Semiconductor and Metal Gratings. Theory and Experiment"
I. Spevak

"NMR and MW Techniques for Detection of Explosive and Illicit Materials"
B. Rameev, B. Aktaş



Figure 10. Prof. Igor Lyubchanskii telling about superconducting photonic crystals.



Figure 9. Prof. Vito Pascazio and Prof. Konstantin Lukin chairing the plenary session.

"Atomic Functions Theory: 45 Years Behind"
V. Kravchenko, O. Kravchenko, V. Pustovoi, D. Churikov, V. Volosyuk, V. Pavlikov

The Symposium continued working with three parallel sessions after lunchtime: Session D. "Antennas, Waveguide and Integrated Circuits;" Session E. "Solid State Devices, Waves in Semiconductors and in Solid State Structures, Radiospectroscopy;" Session F. "Artificial Materials: Metamaterials and Composite Structures, Terahertz Technologies." The following invited paper was presented in Session F: "Resonant Interaction of Electromagnetic Waves in the Defective Photon Crystal Bordering on Conducting Medium," N. Beletskii, S. Borysenko.

A walking tour was organized at the end of the day for all of the symposium participants. The tour was led by a famous Kharkiv guide, Max Rozenfeld.

June 23

The third day of the symposium started with a plenary session (Figure 9) with the following invited talks:

"Compressed Sensing for Imaging Radar and Radar Tomography"
V. Pascazio



Figure 11. The symposium session, "Wave Propagation, Radar, Remote Sensing, and Signal Processing."



Figure 12. The symposium session, “Microwave Superconductivity.”

“Millimeterwave Noise Radar Tomography”

K. Lukin, P. Vyplavin, V. Palamarchuk, V. Kudryashev, S. Lukin, P. Sushchenko, N. Zaets, L. Yurchenko, D. Tatyanko, A. Shelekhov, O. Zemlyaniy, Yu. Shyian

“On the Nature and General Regularities of Optical Activity in Planar-Chiral Double-Layer Metamaterials”

A. Kirilenko, S. Prosvirnin, A. Perov, S. Steshenko, V. Derkach, N. Kolmakova, S. Prikolotin, D. Kulik

“Superconducting Photonic Crystals”

I. Lyubchanskii, N. Dadoenkova, Yu. Dadoenkova, A. Zabolotin, M. Krawczyk (Figure 10)

“Stepped Frequency Continuous Wave Ground Penetrating Radar Applications”

V. Sugak

The symposium continued with three parallel sessions after lunchtime: Session D. “Antennas, Waveguide and Integrated Circuits;” Session G. “Wave Propagation, Radar, Remote Sensing and Signal Processing;” Session H. “Electromagnetic Theory and Numerical Simulation.

That evening, the symposium banquet was held at the university restaurant. It was a great opportunity for the participants to remember the symposium’s history, and to communicate in a friendly relaxed atmosphere.



Figure 14. The First Prize was awarded to Liubov Ivzhenko.



Figure 13. The MSMW'2016 symposium closing ceremony.

June 24

The fourth day of the symposium started with two parallel sessions: Session G. “Wave Propagation, Radar, Remote Sensing, and Signal Processing” (Figure 11); Session I. “Microwave Superconductivity” (Figure 12).

The following invited paper was presented in Session I:

“Laser Scanning Microscopy of Superconducting Electromagnetic Metamaterials,” A. Zhuravel, A. Ustinov, S. Anlage.

Plenary sessions continued the symposium program after a short coffee break, with the following invited papers:

“Spectral Polarimetric Method for Remote Sensing of Natural Environment”

F. Yanovsky

“Active-Passive Remote Sensing of Clouds and Liquid Precipitation”

G. Khlopov, O. Voitovych, S. Khomenko, A. Linkova, G. Veselovska, V. Kabanov, T. Tkacheva

“Modern Progress in the Area of Cylindrically Conformal Antennas: Theory, Design and Experiment”

A. Svezhentsev, V. Volski, S. Yan, Ping Jack Soh, G. Vandenbosch



Figure 15. A Second Prize was awarded to Simeon Zhyla.



Figure 16. Dr. Sergey Ponomarenko (l) receiving the award from MSMW'2106 Organizing Committee Co-Chair Dr. Mikhail Balaban.

The closing ceremony of MSMW'2016 started at 13:30 (Figure 13). The winners of the Young Scientist Paper Contest were first presented with the EuMA-MSMW prizes and certificates. This year, the European Microwave Association established a 1000 Euro fund to be awarded to the winners. This was divided into six prizes: one first prize, two second prizes, and three third prizes. The International Awards Jury consisted of the following members: Prof. N. Cherpak, Kharkiv, Ukraine; Prof. T. Idehara, Fukui, Japan; Prof. V. Pascazio, Napoli, Italy; Prof. O. Drobakhin, Dnipropetrovsk, Ukraine. The jury made the following decisions:

First Prize: Liubov Ivzhenko (Kharkiv, Ukraine) for "Crossed Metallic Gratings as Metasurface with Tuned Crossing Angle" (Figure 14)

Two Second Prizes: Simeon Zhyla (Kharkiv, Ukraine) for "Optical Coherence Tomography Imaging with a Planar Broadband Light Beam" (Figure 15) and Masha Bortsova (Kharkiv, Ukraine) for "Polarization Transfer Functions of Remote Sensing Objects"

Three Third Prizes: Jakub Sorocki (Krakow, Poland) for "Differentially Excited Coupled-Line Sensor for Small Dielectric Samples Detection;" Oleksii Patoka (Kharkiv, Ukraine) for "Spatial Structure of Five Star Forming Regions: $121.28+0.65$, $34.403+0.233$, $77.462+1.759$, $99.982+4.17$ and $37.427+1.518$;" and Sergey Ponomarenko (Kharkiv, Ukraine) for "Development of Compact CW Clinotrons for DNP-NMR Spectroscopy" (Figure 16).

The Young Scientist Prize for the best poster presentation was awarded to Tatyana Kalmykova (Kharkiv, Ukraine) for "Simulation of the Electron Magnetic Resonance Peak Shape for Fe₃O₄ Nanopowder."

The final closing address was given by the MSMW'2016 Chair, Prof. Petr N. Melezhik. He announced that the next symposium, MSMW 2019, would be traditionally held in Kharkiv in June, 2019. He then thanked all the participants and organizers, and expressed the hope that the MSMW symposia series would continue. He acknowledged international institutions such as the IEEE, URSI, and EuMA for rendering valuable and timely support. The social program of the symposium concluded with a concert at Kharkiv Philharmonic.

Prof. Petr N. Melezhik
MSMW'2016 Chairman
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