XVIII[th] International Seminar/Workshop DIPED-2013

The XVIII[th] International Seminar/Workshop on Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory (DIPED-2013) was organized by the IEEE MTT/ED/AP/CPMT/SSC West Ukraine and MTT/ED/AP Georgian Chapters. The event was held at the Pidstryhach Institute for Applied Problems in Mechanics and Mathematics (IAPMM), Lviv, Ukraine, on September 23-26, 2013 (Figure 1). The IAPMM and Ivane Javakhishvili Tbilisi State University (TSU) were the co-organizers of DIPED-2013. IEEE Antennas & Propagation Society, Electron Devices Society, and Microwave Theory & Techniques Society provided the Technical Co-Sponsorship for the Seminar/Workshop.

Figure 1. Welcome of Prof. Roman Kushnir, IAPMM director

The IEEE Solid State Circuits Society and IEEE Section Ukraine were the supporting IEEE institutions.

Dr Mykhaylo Andriychuk, Chairman of the Organizing Committee, Prof. Revaz Zaridze and Prof. Nikolai Voitovich, both the International Program Committee Co-Chairmen, Dr. Iryna Ivasenko, Chairperson of the West Ukraine Joint Chapter, and Dr. Giorgi Ghvedashvili, Georgian Joint Chapter Chairman, bended all efforts for the general and local organization of the event.

The DIPED-2013 technical program consisted of 49 papers, including 4 invited talks. Scientists from Bulgaria, China, Georgia, Germany, Israel, Pakistan, Poland, Russia, Turkey, USA and Ukraine brought forward their papers. The papers were arranged at the following sections:

- Theoretical Aspects of Electrodynamics
- Propagation in Complex Media
- Antenna Design
- Inverse Problems and Antenna Synthesis
- Analytical and Numerical Methods
- EM Field Applications
- Acoustics

The Plenary Session started with online presentation by Prof. Boris Z. Katsenelenbaum (Naharia, Israel) devoted to antiradar protection of bodies by surfaces with impedance and dielectric coatings (Figure 2).

The mathematical technique was developed which permits to determine the parameters of coatings providing for bodies of different shape their invisibility from the direction of one-position radar. The "invisibility" means that the scattered field, which arises when a wave radiated by the radar falls on the body, equals zero at the position where the radar is located. This condition must be satisfied for all orientations of the radar with respect to the body. The both widely used impedance and dielectric (nonmagnetic) coatings were considered. The first results related to the protection of non-planar surfaces were presented and possible directions of further investigations in this field were pointed out.

Figure 2. Prof. Nikolai Voitovich introducing online presentation of Prof. Katsenelenbaum

The next contribution "The method of auxiliary sources for antenna synthesis problems" was given by Prof. Revaz S. Zaridze (Tbilisi, Georgia) (Figure 3). Based on the Method of Auxiliary Sources (MAS) by means of the scattered field singularities localization, antenna synthesis problem with given pattern directivity was considered. This problem has ambiguous solution, because the same pattern at the same frequency could get with the different current distribution on certain antenna surface. But there exists unique optimal current distribution in order to get efficiently given pattern. It could be realized with minimal value of the currents, reactive near field and the best matched antenna to radiation. Optimal current distribution is related to the desired pattern's scattered field singularities.

Figure 3. Prof. Revaz Raridze, giving the presentation on MAS and antenna synthesis problems

Very interesting contribution was given by Prof Olexiy P. Piddubniyak (Lodz, Poland) (Figure 4), titled "Sound radiation from aircraft during takeoff". The problem of sound radiation from airplane during takeoff in wind conditions was considered. The aircraft engines were modeling as point sources moving in air with constant velocity under an angle to the plane interface of acoustic and solid elastic half-spaces. The solution of problem was obtained using the integral Fourier-transforms over time and space coordinates, and the stationary phase method. The numerical analysis of spatial-time distributions of sound pressure and sound pressure level was carried out for takeoff case of the twin-engine aircraft Boeing 777-300ER.

Figure 4. Prof. Olexiy Piddubniyak presenting the contribution about aircraft sound radiation

The DIPED traditional topics were extended by presentations related to the antenna design, application of EM waves in environment investigations, role of EM field scattering in arrangement of smart house systems, as well as to elaboration of novel modelling systems.

The following young participants were granted by the Best Young Speaker Award:

Ms. Veriko Jeladze (Tbilisi State University, Tbilisi. Georgia) (Figure 5) for "**Human exposure simulation in big scenarios using MAS**".

Figure 5. Ms. Veriko Jeladze presenting the results related to human exposure simulation

Mr. Olexiy Sharabura (Physiko-Mechanical Institute, Lviv, Ukraine) (Figure 6) for "**Axially-symmetric excitation of conical monopole antenna**".

Figure 6. Mr. Olexiy Sharabura (l) receiving the Best Young Speaker Award from Dr. Mykhaylo Andriychuk at the Seminar/Workshop dinner

Ms. Nino Kvavadze (Tbilisi State University, Tbilisi. Georgia) (Figure 7) for "**Development of strong motion acceleration and VLF electromagnetic detectors network in Georgia**".

Figure 7. Ms. Nino Kvavadze discussed about development of VLF electromagnetic detectors network in Georgia

Mr. Sebastian Hegler (Technische Universität Dresden, Germany) (Figure 8) for "**Noise mitigation and extraction of scatters in acoustic imaging by compressed sensing**".

Figure 8. Mr. Sebastian Hegler (r) was granted also by the Best Young Speaker Award

Figure 9. Prof. Henryk Lasota, Gdansk, Poland, giving the thanks speech from the Polish delegation

Figure 10. Memory photo at the Seminar/Workshop dinner

Following the DIPED tradition, the time given up to the free lobby discussion taken a considerable part of total duration of DIPED-2013. The warmest discussions continued also at the DIPED-2013 dinner (Figures 9-10).

It was announced by the organizers that the next Seminar/Workshop DIPED will be held at the Tbilisi State University, Tbilisi, Georgia, on September 22-25, 2014. The previous attendees and new participants are cordially invited.

Dr. Tamar Gogua
IEEE MTT/ED/AP Georgian Chapter
Ivane Javakhishvili Tbilisi State University
1 Chavchavadze Ave
0179, Tbilisi, Georgia
E-mail: tamar.gogua@tsu.ge

Dr. Mykhaylo Andriychuk
IEEE MTT/ED/AP/CPMT/SSC West Ukraine Chapter
IAPMM of NASU
3"B" Naukova St.
79060, Lviv, Ukraine
E-mail: andr@iapmm.lviv.ua