

# Physical Aspects of Microwave and Radar Applications

International Microwave and Radar Week, Vilnius 2010

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**WARSAW**

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**POLISH ACADEMY OF SCIENCES  
INSTITUTE OF PHYSICS**

## Fourth Microwave and Radar Week MRW-2010

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## Preface

International Microwave and Radar Week, MRW-2010, was held in Vilnius on June 14–18, 2010. It consisted mainly of two conferences: MIKON and IRS, each of them having a long tradition.

International Conference on Microwaves, Radar and Wireless Communications MIKON was initiated in 1969. At the beginning it was named “The Conference on Microwave Solid State Electronics” since at that time the Polish microwave community was mainly fascinated by the revolutionary idea of “high frequency electronics without vacuum tubes”. In the eighties the name was changed to MIKON and in 1994 the conference received an international status. Since then it has been organised biannually, typically in May, under the auspices of two parent institutions: the Polish Academy of Sciences, being the original one, and the new one — the Institute of Electrical and Electronics Engineers (IEEE). Technical sponsorship of the IEEE and high interest of that organization to promote the scientific activity in the rapidly changing Eastern and Central Europe was very helpful. MIKON quickly gained its standing of a leading international conference in our part of Europe. It became the second largest microwave conference in Europe. Almost 140 papers were accepted for MIKON-1994 as well as for MIKON-1996. In each of the following three conferences: in Krakow (1998), Wroclaw (2000), and Gdansk (2002) we had about 190 papers. The numbers further increased at the conference in Warsaw (2004) and a record-breaking conference of Krakow (2006), where more than 250 papers were presented. We then had 220 presentations in Wroclaw (2008). MIKON-2010 program comprised 204 presentations grouped in 31 sessions. There were 3 plenary sessions, 26 oral ones, held in 3 parallel streams, and 2 very large poster sessions.

The International Radar Symposia series was initiated by Prof. Dr. Hermann Rohling from the Technical University Hamburg-Harburg in 1998 as the first European conference series on radar technology. The first conference in Munich (IRS98) was followed by the Symposia in Berlin (2000), Bonn (2002), Dresden (2003), Warsaw (2004), Berlin (2005), Kraków (2006), Cologne (2007), Wrocław (2008), Hamburg (2009), and Vilnius (2010). The success of this conference series counted by the number of presented papers and high number of participants was the motivation to form the Microwave and Radar Week (MRW). The first one was organised in Warsaw (2004) for emphasis cooperation in the radar field between Poland, Germany, and whole United Europe. From that time IRS organised within MRW was co-chaired by Prof. Herman Rohling and Prof. Krzysztof Kulpa from the Warsaw University of Technology. The International Radar Symposium IRS-2010 gathered more than 200 participants from 24 countries. Over 120 scientific papers were presented at 21 technical oral sessions and 2 poster sessions.

The Microwave and Radar Week was organised in Warsaw (2004), Kraków (2006), and Wrocław (2008). In 2010, for the first time the International Microwave and Radar Week was moved outside of the borders of Poland – to Vilnius, to highlight the long-lasting cooperation and union between the two countries and to show how fast borders between countries have been vanishing within the EU. It was also the suggestion for other countries to host MRW in the near future, so as to increase cooperation between scientists in the region. We all feel that there is a need to rethink the distribution of small and medium size scientific conferences in Poland and its neighbourhood in terms of their thematic and geographical coverage. Many of us think that further concentration of effort of different scientific communities is needed. There is also a growing interaction between different scientific specialisations.

The microwave electronics and radar technology have their roots in physics. In the 20th century the great numbers discoveries in physics was motivated by the rapid development of microwave and radars during WWII and Cold War. Since that time microwave and radar technology have been treated more like technology than science, but a lot of new ideas are in that field. Thus we felt it would be interesting to share some of our works with the readers of *Acta Physica Polonica A*. This brought the idea of a special issue of *Acta Physica Polonica A* presenting extended versions of selected MIKON and IRS papers. The team of guest editors was composed of three persons:

- Prof. Wojciech Gwarek - co-chair of the Technical Programme Committee of MIKON 2010
- Prof. Krzysztof Kulpa – co-chair of the Technical Programme Committee of IRS 2010
- Adam Abramowicz – president of the jury of the Young Scientists Contest of MIKON 2010.

Guest editors are presenting to APPA readers a selection of 18 papers. Eight of them concern the radar techniques. Not surprisingly, most of them deal with the problems characteristic for modern radar science: sophisticated signal processing techniques for extracting signals from below the noise level. We hope that the specialists in physics will recognise that some of those problems are similar to those facing them in experimental physics. Ten papers concern

various aspects of microwave theory and techniques. They were also chosen taking into account possible interest of the audience of the physicists. Typical electronic circuit subjects were avoided.

Instead we have a variety of subjects related to general properties of materials, devices, and waves propagating in various media from RF to millimetre wave frequency range. Transmission lines (TEM, planar, waveguides), resonators, and antennas are analysed with different methods of electromagnetic simulations. Measurement methods for very short pulses and very long-lasting observations as well as measurements of electric properties are described. And at last realisation of the millimetre wave gyrotron is presented.

Guest Editors hope that most of the APPA readers will find something of interest in the presented papers. Possibly this will prompt them to participate in the next International Microwave and Radar Week planned to be held in Warsaw in May 2012.

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