

SHORT OVERVIEW OF THE 4TH INTERNATIONAL CONFERENCE ON MATERIALS SCIENCE AND CONDENSED MATTER PHYSICS

The journal issue starts the publication of the papers presented at the 4th International Conference on Materials Science and Condensed Matter Physics (MSCMP 2008), which was a continuation of MSCMP 2001, MSCMP 2004, and MSCMP 2006 and was held in the Institute of Applied Physics of the Academy of Sciences of Moldova, Chisinau, September 23-26, 2008. The Conference program included three special Sessions dedicated to the 80th anniversaries of prominent Moldovan physicists Sveatoslav Moskalenko and Vsevolod Moskalenko as well as to the 75th anniversaries of famous Moldovan physicist Andrei Andriesh. A session in memory of prominent Prof. Yulia Boyarskaya, the founder of Laboratory of Mechanical Properties of Materials of IAP ASM, was organized. As for the earlier editions of the conference, the main objective of MSCMP 2008 was to bring together scientists from different areas of Condensed Matter Physics and Materials Science.

Motivation for the conference comes from:

- Quickly evolution in the MS and CMP investigations and appearing of new areas of researches.
- High level of investigations on MS and CMP in the Moldova Research Centers.
- Successful organization of the first editions of MSCMP in 2001, 2004, and 2006.

MSCMP 2008 program included invited and contributed (oral and poster presentations) papers covering the following domains:

- *Materials and structure processing (MSP)* including the aspects of advanced materials and fabrication processes; methods of crystal growth, post-growth technological processes, doping and implantation, fabrication of solid state structures; defect engineering, engineering of molecular assembly.
- *Nanotechnology, nanostructures and nanoelectronics (NNN)* considering methods of nanostructures and nanomaterials fabrication and characterization; quantum wells and superlattices; nanocomposite, nanowires and nanodots; fullerenes and nanotubes, molecular materials, meso- and nanoelectronics.
- *Characterization, physical processes and properties (CPPP)* including methods of material and structure characterization; microscopy and spectroscopy; structure and mechanical characterization; optical properties; electrical, magnetic and superconductor properties, transport processes, non-linear phenomena, size and interface effects.
- *Condensed matter theory (CMT)* highlighting the topics: advances in condensed matter theory; theory of low dimensional systems; modelling of materials and structure properties; development of theoretical methods of solid-state characterization; phase transition; advanced quantum physics for nanosystems.
- *Solid-state device physics (SSDP)* covering the topics: device modelling and simulation, device structures and elements; micro- and optoelectronics; photonics; microsensors and micro electro-mechanical systems; microsystems; degradation and reliability, solid-state device design.

More than 200 papers were presented at the conference — Invited: 31; Oral: 35; Poster: 145. The conference attracted around 70 foreign participants from 15 countries (France, United Kingdom, Israel, Greece, USA, Poland, Hungary, Turkey, Spain, Romania, Latvia, Russia, Belorussia, Ukraine) and about 150 researchers from R. Moldova.

There were presented and discussed:

- At the Section “Materials and structure characterization (MSC)” 40 papers — 12 oral and 28 poster presentations.

- At the Section “Characterization, physical processes and properties” 96 papers — 20 oral and 65 poster communications.
- At the Section “Condensed-matter theory” 27 papers — 9 oral and 18 poster communications.
- At the Section “Nanotechnology, nanostructures and nanoelectronics (NNN)” 38 papers — 22 oral and 16 poster communications.
- At the Section “Solid-state device physics” 23 papers — 5 oral and 18 poster communications.

In general, the conference has made a significant contribution to revealing the information about new materials and phenomena identified over the last years in domains of the conference topics.

Conference has considerably contributed to the dissemination of the last scientific results obtained in the world and in R. Moldova. The conference has provided the establishing of new links between scientists from different countries. The participants have highly appreciated the incontestable contributions of: Acad. Sveatoslav Moskalenko — to developing theory of excitons and non-linear quantum optics; Acad. Vsevolod Moskalenko — to developing theory of superconductivity and strong correlated systems; Acad. Andrei Andriesh — to developing physics and technology of non-crystalline materials.

The participants of the special session in memoriam of Prof. Yu.S. Boyarskaya have noted the relevance and importance of investigations of mechanical properties of materials using, in particular, the new tools of nanoindentation.

The participants mentioned high scientific level of the presented communications as well as high level of the Conference organization. We thank the session chairmen and all speakers for the high quality of their contributions. Taking into account the evolution in the MS and CMP, participants of the Conference shared the opinion of the USA National Academies, Division of Engineering and Physical Sciences (ESP) concerning SIX SCIENTIFIC CHALLENGES of CMMP FOR THE NEXT DECADE

- How do complex phenomena emerge from simple ingredients?
- How will the energy demands of future generations be met?
- What is the physics of life?
- What happens far from equilibrium and why?
- What new discoveries await us in the nanoworld?
- How will the information technology revolution be extended?

MSCMP 2008 Recommendations include:

- To continue in the future the organization of the International Conference MSCMP and to organize the next Conference in 2010;
- To organize as the Conference satellite a Symposium on MSCMP for young scientists;
- To contact with the EPS in order to have the Condensed Matter Division of the EPS as a supervisor of the Conference in the next edition;
- To prepare a brief information about the Conference for the Europhysics News;
- To publish the Conference papers in the Moldavian Journal of Physical Sciences, involving the participants to review the papers.

Thus, the present journal issue includes the first part of the MSCMP 2008 proceedings following the sequence of the oral presentations at the Conference, complemented by some papers selected from the poster sessions. Finally, on behalf of the MSCMP 2008 Program and Organizing Committees, we wish to deeply thank all the people who generously helped us in organizing and running the MSCMP 2008 conference.

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Chairman of the Program Committee

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