

**Russian Academy of Sciences  
Russian Foundation for Basic Research  
Yaroslavl Branch of the Institute of Physics and Technology  
Yaroslavl Demidov State University  
Scientific Educational Center “Nanotechnology and Innovations”  
Center for Collective Use “Diagnostics of Micro- and Nanostructures”**

**II INTERNATIONAL CONFERENCE  
on  
*MODERN PROBLEMS IN PHYSICS OF SURFACES  
AND NANOSTRUCTURES*  
(ICMPSN-2012)**

**SCIENTIFIC PROGRAM**

**Tuesday, May 22<sup>th</sup>, 2012**

**Arrival of the participants. Hotel accommodation**

**Summer school for young researchers**

**Wednesday, May 23<sup>th</sup>, 2012**

***Conference Hall in Park-Hotel Yaroslavl***

**9.00-10.00 Registration of participants**

**10.00-10.10 Opening the conference. Welcome word of the Head of  
Organizing Committee A.S. Rudy**

**Session 1. Physics and Technology of Nanostructures**

Session Chairman: V.F. Lukichev

- 10.10-10.35 I1-1 Epitaxial graphene on Ir(111) – a playground for the  
(invited) fabrication of graphene hybrid materials**  
T. Michely  
II. Physikalisches Institut, Universität zu Köln, German
- 10.40-11.05 I1-2 Diffusion and growth of para-sexiphenyl molecular  
(invited) films**  
G. Hlawacek  
*MESA+ Research Institute, University of Twente,  
Enschede, The Netherlands*

### 11.10-11.20 Coffee break

- 11.20-11.45    I1-3    **Novel low-dimensional phases of carbon and inorganic materials: insights from DFT simulations and TEM experiments**  
(invited)    A. Krasheninnikov  
*University of Helsinki, Helsinki, Finland*
- 11.50-12.15    I1-4    **Plasmons enhance near-field radiative heat transfer for graphene-covered dielectrics**  
(invited)    V. B. Svetovoy  
*MESA+ Institute for Nanotechnology, University of Twente, Enschede, The Netherlands*
- 12.20-12.45    I1-5    **Defects and electronic structure of CIS thin films: revision**  
(invited)    M.G. Ganchenkova  
*MEPHI, Moscow, Russia*
- 12.50-13.15    I1-6    **Next Generation Lithography – mythes and reality**  
(invited)    S. I. Zaitsev  
*IMT RAS, Chernogolovka, Russia*

### 13.20-14.30 Lunch

#### **Session 2. Physics of thin film growth**

Session Chairman: K.V. Rudenko

- 14.30-14.55    I1-7    **Quantum Mechanical nanoscale magic:the growth of single 7-layer height Pb islands**  
(invited)    M. C. Tringides  
*Ames Laboratory –USDOE, USA*
- 15.00-15.25    I1-8    **Advances in the Self Learning Kinetic Monte Carlo Method and their application to cluster diffusion and morphological evolution on metal surfaces**  
(invited)    T.S. Rahman  
*University of Central Florida, Orlando, USA*
- 15.30-15.45    O1-1    **Influence of doping on the properties of Ge-Sb-Te thin films for phase – change memory devices**  
A. Sherchenkov  
*MIET, Moscow, Russia*
- 15.50-16.05    O1-2    **Metal nanolayer formation on crystal faces with unlike electric charge**  
V. Haiduchok  
*Institute of materials, SCR “Carat” Lviv, Ukraine*

**16.10-16.25 O1-3 Deposition of HfO<sub>2</sub> gate dielectric in ALD processes and its properties**  
A. Miakonkikh  
*Institute of Physics and Technology, Russian Academy of Sciences, Moscow, Russia*

**16.30-19.00 Yaroslavl downtown sightseeing tour**

**Thursday, May 24<sup>th</sup>, 2012**

*Conference Hall in Park-Hotel Yaroslavl*

**Session 3. Modeling of Surface Phenomena**

Session Chairman: O.S. Trushin

- 9.00-9.25 I2-1 Electrostatic interactions in nanoscale systems**  
**(invited)** Sahin Buyukdagli  
*Aalto University, Espoo, Finland*
- 9.30-9.55 I2-2 Unifying model of driven polymer translocation**  
**(invited)** T. Ala-Nissila  
*Aalto University, Espoo, Finland*
- 10.00-10.25 I2-3 Self-organization of nanostructures in ultra-thin films**  
**(invited)** K.R. Elder  
*Oakland University, Rochester MI, USA*
- 10.30-10.45 O2-1 Detailed structure and transformations of grain boundaries in graphene**  
Ossi Lehtinen  
*University of Helsinki, Helsinki, Finland*
- 10.50-11.05 O2-2 Controlling of the size and density of three-dimensional islands self-assembled in kinetic Monte Carlo simulations**  
F. F. Leal  
*Instituto de Educação, Ciência e tecnologia Fluminense, Rio de Janeiro, Brazil*
- 11.10-11.25 O2-3 Modeling the evolution of the surface profile of materials at low-energy ion sputtering**  
A.S.Shumilov  
Yaroslavl branch of the Institute 3a Physics and Technology of Russian Academy of Science, Yaroslavl, Russia

### 11.30-11.40 Coffee break

#### **Session 4. Spintronics and Magnetic Nanostructures**

Session Chairman: V.V. Kostyuchenko

- 11.40-12.05**    **I2-4**    **Electric-field control of magnetic domain wall motion and local magnetization reversal in multiferroic heterostructures**  
(invited)    Sebastiaan van Dijken  
*Aalto University, Espoo, Finland*
- 12.10-12.25**    **O2-4**    **New magnetic and magnetoelectric phenomena in tetrahedron single molecule magnets**  
V.V.Kostyuchenko  
*Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences, Yaroslavl, Russia*
- 12.30-12.45**    **O2-5**    **Mössbauer study of magnetite nanoparticles surface**  
M. Shipilin  
*Yaroslavl State University named after P.G. Demidov, Yaroslavl, Russia*
- 12.50-13.05**    **O2-6**    **Fabrication of InGaAs/GaAs light-emitting diodes with GaMnSb and GaMnAs ferromagnetic injector layer**  
M.V. Dorokhin  
*Physico-Technical Research Institute of Nizhny Novgorod State University, Nizhny Novgorod, Russia*

### 13.10-14.00 Lunch

#### **Session 5. Electronic transport in nanostructures**

Session Chairman: A.A. Popov

- 14.00-14.15**    **O2-7**    **The conductivity of DNA molecules**  
T.I. Sharipov  
*Bashkir State University, Ufa, Russia*
- 14.20-14.35**    **O2-8**    **Electron transport in relaxed high doping transistor Si/Si<sub>1-x-y</sub>Ge<sub>x</sub>C<sub>y</sub> heterostructures**  
M.L. Orlov  
*Institute for Physics of Microstructures, Russian Academy of Sciences, N.Novgorod*

**14.40–14.55 O2-9 Antihysteresis in voltage-capacitance characteristic of MIS with multilayer insulator**

A.A.Popov

Yaroslavl Branch of the Institute of Physics and Technology of Russian Academy of Sciences; Yaroslavl, Russia

**15.00-15.15 O2-10 Tunneling and current instability in two-miniband superlattices with unsymmetrical unit cell**

J.Yu. Romanova

*Institute for Physics of Microstructures, Russian Academy of Sciences, Nizhny Novgorod, Russia*

**15.20-15.30 Coffee break**

## **Session 6. Perspective devices of micro and nanoelectronics**

Session Chairman: I.I. Amirov

**15.30-15.55 I2-5 Gas Sensors Based on MEMS Platforms**

**(invited)** A.A.Vasiliev

*Institute of Applied Chemical Physics, NRC “Kurchatov Institute”, Moscow, Russia*

**16.00-16.15 O2-11 Principal Physical and Technological Problems and Technical Solutions for Creating a New Generation of High-Temperature Microelectromechanical SOIMT Strain Sensors**

L.Sokolov

*Branch of MAI, “Strela”, Zhukovsky, Russia*

**16.20-16.35 O2-12 Application of Amplitude Response of Scanning Differential Heterodyne Microscope for Characterization of Triangular and Trapezoidal Plasmon Waveguides**

I. M. Akhmedzhanov

*A. M. Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow*

**16.40-16.55 O2-13 KELVIN PROBE METHOD IN SCANNING PROBE MICROSCOPY**

Salimov R. R

*Bashkir State university, Ufa, Russia*

**17.00-19.00 POSTER SESSION I**

**19.00-22.00 Conference dinner**

**Friday, May 25<sup>th</sup>, 2012**

***Conference Hall in Park-Hotel Yaroslavl***

**Session 7. Self-organization on the surface**

Session Chairman: V.I. Rudakov

- 9.00-9.15 O3-1 Forming of self-organizing nanostructures at laser heating**  
A.O. Kecherik  
*Department of Physics and Applied Mathematics,  
Stoletov's Vladimir State University, Vladimir, Russia*
- 9.20-9.35 O3-2 Self-organization in adlayers on metallic nanosystems**  
N. Socolova  
*Frumkin Institute of Physical Chemistry and  
Electrochemistry, Russian Academy of Sciences,  
Moscow, Russia*
- 9.40-9.55 O3-3 Research of gas-sensitive cobalt-containing polyacrylonitrile films using the theory of self-organization**  
S. Konovalenko  
*Taganrog Pedagogical Institute named after A.P.  
Chekhov, Taganrog, Russia*
- 10.00-10.10 Coffee break**

**Session 8. Nanocomposites and porous media**

Session Chairman: A. Prokaznikov

- 10.10-10.25 O3-4 Formation of ordered structure of porous silicon in outside the electrodes discharge plasma**  
M. Novozhenin  
*Samara State Aerospace University, Samara, Russia*
- 10.30-10.45 O3-5 Formation of fractal porous clusters in silicon**  
A. V. Prokaznikov  
*Yaroslavl Branch of the Institute of Physics and  
Technology, Russian Academy of Sciences, Yaroslavl,  
Russia*
- 10.50-11.05 O3-6 Variation of the pore morphology for the porous lead selenide layers on silicon substrates**  
S.P. Zimin  
*Yaroslavl State University named after P.G.  
Demidov, Yaroslavl, Russia*

- 11.10-11.25 O3-7 Calcium hydroxyapatite (HAp) and methylcellulose (MCel) interaction by their coprecipitation from aqueous solutions in the course of HAp/MCel nanosized biocomposites synthesis**  
 N. Zakharov  
*Kurnakov Institute of General and Inorganic Chemistry of the Russian Academy of Science, Moscow, Russia*
- 11.30-11.45 O3-8 New Generation of Lithium-ion Batteries: Role of Nanostructured Materials**  
T. Kulova  
*Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia*
- 11.50-12.05 O3-9 Structure, composition distribution and properties of the (Ga,Mn)Sb/GaAs and MnSb/GaAs heterosystems**  
Yu.A. Danilov  
*Physico-Technical Research Institute of University of Nizhni Novgorod, Nizhni Novgorod, Russia*
- 12.10-12.25 O3-10 Structure and properties of ZnSSe nanostructures embedded into nanoporous Al<sub>2</sub>O<sub>3</sub> films**  
R. Valeev  
*Physical-Technical Institute of Ural Branch of Russian Academy of Sciences, Izhevsk, Russia*
- 12.30-12.45 O3-11 Nano-porous silicon produced by helium plasma immersion ion implantation as a material for photovoltaic applications**  
A. Rogozhin  
*Institute of Physics and Technology, Russian Academy of Sciences, Moscow, Russia*
- 13.00-14.00 Lunch**

## **Session 9. Properties of micro and nanostructures**

Session Chairman: A. Prokaznikov

- 14.00-14.15 O3-12 Study on water adsorption on oxygen passivated silicon nanoparticles**  
R. Fedyuk  
*Far Eastern Federal University, Vladivostok, Russia*

- 14.20-14.35 O3-13 Mechanism of microtribometric interaction of semiconductor wafers in assessment of surface cleanliness**  
V. Kolpakov  
*Image Processing Systems Institute of the RAS, Samara, Russia*

### **Session 10. Ion to surface interactions**

Session Chairman: V. Bachurin

- 14.40-14.55 O3-14 Particle trapping in various materials under low energy plasma irradiation**  
A. Ayrapetov  
*National Research Nuclear University MEPhI, Moscow, Russia*
- 15.00-15.15 O3-15 The investigation of hydrogen sorption-desorption process by carbon material with content of carbon nanotubes**  
L. Gulidova  
*Institute of Physics and Technology, Tomsk Polytechnic University, Tomsk, Russia*
- 15.20-15.35 O3-16 Changes of surface layers composition, surface morphology and mechanical properties of carbon steel due to various parameters of ion irradiation**  
P.V. Bykov  
*Physical-Technical Institute of the Ural Branch of the Russian Academy of Sciences, Izhevsk, Russia*
- 15.40-15.55 O3-17 Nanomaker-the means of electron lithography for ultimate resolution**  
S. I. Zaitsev  
Interface Ltd, Moscow, Russia

**16.00-19.00 POSTER SESSION II**

**19.00 Conference closing**

**Saturday, May 26<sup>th</sup>, 2012**

**Departure of participants**



## ***POSTER SESSIONS***

**Thursday, May 24<sup>th</sup>, 2012**

***Conference Hall in Park-Hotel Yaroslavl***

**16.00-19.00 POSTER SESSION I**

- P2-1 Electric current mechanics in reverse-biased p-i-n-structures under strong electrical field**  
V.S. Kuznetsov  
Yaroslavl State University, Yaroslavl
- P2-2 Geometric constraints of orbital entanglement production in normal conductors**  
S. Rodríguez-Pérez  
Universidade Federal de São Carlos, São Carlos, SP, Brazil
- P2-3 Molecular dynamics simulations of energy and impact angle of incidence of ions on the ion-plasma sputtering of copper**  
A.N. Kupriyanov  
Yaroslavl branch of the Institute za Physics and Technology of Russian Academy of Science, Yaroslavl, Russia
- P2-4 Surface alloying during Pd/Cu(100) deposition**  
O.S. Trushin  
Yaroslavl branch of the Institute za Physics and Technology of Russian Academy of Science, Yaroslavl, Russia
- P2-5 Modeling LINEAR defects in graphene and NANOGRAPHENE**  
**V. Stelmakh**  
*Arifov Institute of Electronics, Tashkent, Uzbekistan*
- P2-6 Micromagnetic modeling of spin-valve structure with technological imperfections**  
N. Barabanova  
*Yaroslavl State University, Yaroslavl, Russia*
- P2-7 Variational calculation of the image potential near a surface, taking into account the three-dimensional distribution of screening charge**  
S.E. Efimovsky  
*Northern State Medical University, Arkhangelsk, Russia*

- P2-8 Application of ion implantation for making MIS nanotransistors with local area of the buried insulator**  
S.A. Krivelevich  
*Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences, Russia*
- P2-9 Conductance quantization of nanojunctions dynamically formed between two rough molybdenum surfaces observed in air at room temperature**  
L. Fedichkin  
*Institute of Physics and Technology, Russian Academy of Sciences, Moscow, Russia*
- P2-10 The effect of surface properties on electric absorption of fine metallic particles**  
I.A.Kuznetsova  
*Demidov Yaroslavl State University, Yaroslavl, Russia*
- P2-11 Dynamic effects of mossbauer spectroscopy for iron compounds in natural nanostructures**  
A. A. Zalutskii  
*Yaroslavl State Technical University, Yaroslavl, Russia*
- P2-12 Dependence of magnetic parameters on a thickness and formation conditions of permalloy films**  
A.V.Morozov  
*Yaroslavl State University, Yaroslavl, Russia*
- P2-13 Comparative study of ultrathin Co films grown by ion-plasma and magnetron sputtering**  
V.F. Bochkarev  
*Yaroslavl Branch of the Institute of Physics and Technology of RAS, Yaroslavl, Russia*
- P2-14 Mössbauer study of ZnO implanted with iron ions at high temperature**  
E.N. Dulov  
*Kazan (Volga Region) Federal University, Kazan, Russia*
- P2-15 The Influence of Superparamagnetism in Magnetic properties of the Alloy MnAl**  
V. Boydenko  
*P.G. Demidov Yaroslavl State University, Yaroslavl, Russia*

- P2-16 Influence of an external magnetic field on the structure of granular Co-Cu films deposited by ion-plasmic method**  
Ed. Buchin  
*Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences, Yaroslavl, Russia*
- P2-17 Investigation of thermal characteristics and stability of Ge-Sb-Te-Ti thin films**  
A. Sherchenkov  
*National Research University of Electronic Technology, Moscow, Russia*
- P2-18 Electrical and thermal properties of indium doped Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> thin films**  
P. Lazarenko  
*National Research University of Electronic Technology, Moscow, Russia*
- P2-19 Stress fields within the cantilever console according to raman scattering**  
A. Kuzmenko  
*South-West State University, Kursk, Russia*
- P2-20 CW laser-induced nanomodification of PbX films**  
S.V. Kutrovskaya  
*Stoletov's Vladimir State University, Vladimir, Russia*
- P2-21 Vapor phase epitaxy fabrication of self-organized Mn-doped InAs/GaAs quantum dot arrays**  
A.V. Zdoroveishev  
*Physico-Technical Research Institute of Nizhny Novgorod State University, Nizhny Novgorod, Russia*
- P2-22 Multilayered photovoltaic structures based on tetrathiadiazoloporphyrine/subphthalocyanine heterojunction**  
G. Pakhomov  
*Institute for Physics of Microstructures, Russian Academy of Sciences (IPM RAS), Nizhny Novgorod, Russia*
- P2-23 Kelvin Probe Microscopy Studies of the Surface Potential Variations on the Si(111)/Me Surface**  
S.V. Kazarinov  
*Department of Physical Electronics and Nanophysics Bashkir State University, Ufa, Russia*

- P2-24 The carrier transport in the ferromagnetic quantum confined structures**  
A. Kudrin  
*Physico-Technical Research Institute of University of Nizhny Novgorod, Nizhny Novgorod, Russia*
- P2-25 Size effect in multilayer metallic nanocantilevers**  
I.V. Uvarov  
*Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences, Yaroslavl, Russia*
- P2-26 Influence of the conditions of ion-plasma sputtering on the surface roughness of platinum film**  
R.V. Selyukov  
*Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences, Yaroslavl, Russia*

**Friday, May 25<sup>th</sup>, 2012**

***Conference Hall in Park-Hotel Yaroslavl***

**16.00-19.00 POSTER SESSION II**

- P3-1 Laser synthesis of nanostructures**  
A. Antipov  
*Stoletov Vladimir State University, Vladimir, Russia*
- P3-2 Synthesis of transparent carbon films with operated morphology in constant electric field**  
A. Osipov  
*Stoletov Vladimir State University, Vladimir, Russia*
- P3-3 Oscillations profiles of thermoelectric parameters in nanostructures on the base of lead telluride**  
D. Freik  
*Physics and chemistry institute at PreCarpathian Vasyl Stefanyk National University, Ivano-Frankivsk, Ukraine*
- P3-4 Technology features silicon nanostructured electrodes for lithium-ion batteries**  
A.E. Berdnikov  
*Yaroslavl Branch of Physics and Technology Institute of Russian Academy of Sciences, Yaroslavl, Russia*

- P3-5 Layer cold cathodes based on nanostructured diamond-like materials**  
A. Belyanin  
*Central Research Technological Institute  
 “TECHNOMASH”, Moscow, Russia*
- P3-6 Effect of annealing on formation of *high-k* insulators in the W/ultrathin HfO<sub>2</sub>/Si (100) system**  
V. Rudakov  
*Yaroslavl Branch of the Institute of Physics and Technology RAS., Yaroslavl, Russia*
- P3-7 Investigation of Cement Structure Formation by Small-Angle Neutron Scattering Experiments**  
A. Guryanov  
*Samara State University of Architecture and Civil Engineering, Samara, Russia*
- P3-8 Electrical properties of plasma-chemical silicon dioxide processed by boiling water in the metal - oxide - metal structure**  
V. Levin  
*Yaroslavl Branch of the Institute of Physics and Technology, Yaroslavl, Russia*
- P3-9 Photosensitive and luminescence porous silicon based structures**  
N. Latukhina  
*Samara State University, Samara, Russia*
- P3-10 The features of interactions of disilane molecular beam with the epitaxial surface in conditions of silicon layer growth**  
N.L.Ivina  
*Nizhni Novgorod Management Institute, Nizhni Novgorod, Russia*
- P3-11 Low-frequency noise spectroscopy as a diagnostic tool to study of surfaces**  
M. Makoviychuk  
*Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences, Yaroslavl, Russia*
- P3-12 Neural network modeling for prediction of gas-sensitivity of Ag-containing polyacrylonitrile films**  
T.A.Bednaya  
*Taganrog State Pedagogical Institute, Taganrog, Russia*

- P3-13** **Three-dimensional model of adsorption-diffusion-reaction processes with a Tri-State**  
N. A. Rud  
*Yaroslavl Demidov State University, Yaroslavl, Russia*
- P3-14** **Incorporation in grow film previously produced nanosize particles during low frequency PECVD**  
A.E.Berdnikov  
 Yaroslavl Branch of the Institute of Physics and Technology, Russian Academy of Sciences; Yaroslavl, Russia
- P3-15** **Aluminum Nanoisland Films Formation under the Electron Irradiation of the Sapphire Surface**  
I.P. Ivanenko  
*Physics Department, Moscow State University, Moscow, Russia*
- P3-16** **Particle trapping in stainless steel in oxygen contaminated deuterium plasma**  
L. Begrambekov  
*National Research Nuclear University (MEPhI), Moscow, Russia*
- P3-17** **Hydrogen trapping in zirconium and zirconium with chromium coating under hydrogen saturation in various conditions**  
L. Begrambekov  
*National Research Nuclear University “MEPhI”, Moscow, Russia*
- P3-18** **Ion implantation of rolled copper-nickel foils and manifestations of long-range effect**  
A. A. Novoselov  
*Physical-Technical Institute UrB RAS, Izhevsk, Russia*
- P3-19** **THE FEATURES OF INTERACTION OF DISILANE MOLECULAR BEAM WITH THE EPITAXIAL SURFACE IN CONDITIONS OF SILICON LAYER GROWTH**  
L.K. Orlov  
 NNSThU, Nizhni Novgorod, Russia
- P3-20** **Investigation of the surface structure of solids and liquids by ellipsometry in a severe mathematical incorrectness of the inverse problem.**  
A.I. Semenenko  
*State University, Sumy, Ukraine*

- P3-21 Simulation of bone tissue/carbon nanotubes interaction during biomineralization**  
N. Zakharov  
*Kurnakov Institute of General and Inorganic Chemistry of the Russian Academy of Science, Moscow, Russia*
- P3-22 Effect of multi – walled carbon nanotube on tribological properties of field and lubricant**  
N. Savinski  
*Yaroslavl branch of of Physics & Technology Institute of Russian Academy of Sciences, Yaroslavl, Russia*
- P3-23 The study of the dynamics of calcifying nanoparticles**  
O.Y. Prikhodko  
*Facilities Sharing Centre "Micro- and Nanostructures Diagnosis", Demidov State University, Yaroslavl, Russia*
- P3-24 Fraktalnaja processing of surfaces of cancer diseases of a skin**  
L. Nefed'ev  
*Physics institute, the Kazan (Privolzhsky) federal university, Kazan, Russia*
- P3-25 Self-organization of oligopeptides thin films due to organic vapors**  
I.G. Efimova  
*Kazan (Volga region) federal university, Kazan, Russia*
- P3-26 Application of ion beam cutting for multi-layered metal/oxide system**  
N. Suhodoeva  
*Polytechnic institute of Siberian Federal University, Krasnoyarsk, Russia*