



International Conference

“FUNDAMENTAL AND APPLIED NANO ELECTROMAGNETICS”

Belarusian State University, Minsk, Belarus, May 22-25, 2012

EU FP7 Project № 266529 BY-NanoERA

AGENDA

May 21, Monday

Institute for Nuclear Problems, Bobruiskaya Str. 11, room, 316

15.00 – 18.00 – Registration

May 22, Tuesday

Red House (Rectorat), Bobruiskaya Str., 5A

08.30 – 9.15 – Registration

General session I.

Session Chairs:

Oleg Ivashkevich, Belarusian state University, Belarus
Sergey Maksimenko, Institute for Nuclear Problems
BSU, Belarus

09.15 – 09.45 – Welcome

09.45 – 10.30 – Key Lecture

Surface Multiplasmonics

Akhlesh Lakhtakia, Pennsylvania State University, USA

10.30 – 11.00 – Coffee-Break

General session II.

Session Chair:

Gregory Slepyan, Research Institute for Nuclear Problems, Belarus

11.00 – 11.30 – Invited

Carbon Nanotubes and Graphene as Terahertz Emitters and Detectors
Mikhail Portnoi, University of Exeter, United Kingdom

11.30 – 12.00 – Invited

From nanophotonic devices to nanophotonic integrated circuits: advances and challenges in development of scalable simulation approaches
Sergei Mingaleev, VPI Development Center, Belarus

12.00 – 12.45 – Key Lecture

Elasticity at the nanoscopic scale
Philippe Lambin, Dept of Physics, FUNDP, Belgium

Institute for Nuclear Problems, Bobruiskaya Str. 11, room 310

12.00 – 12.45 – EU FP7 CACOMEL project, consortium meeting

12.45 – 14.30 – Lunch break

Red House (Rectorat), Bobruiskaya Str. 5A

Quantum chemistry simulation.

Session chair:

Galyna Dovbeshko, Institute of Physics of National Academy of Science of Ukraine, Ukraine

14.30 – 14.50 – Oral

Electron structure of pure and doped nanotubes calculated using linear augmented cylindrical wave method
Pavel D'yachkov, Kurnakov Institute of General and Inorganic Chemistry, RAS, Russia

14.50 – 15.10 – Oral

Simulation of Electromagnetic Properties in CNT and Graphene Based Nanostructures
Yuri Shunin, Information Systems Management Institute-Solid State Physics Institute, University of Latvia, Latvia

15.10 – 15.30 – Oral

Electronic and optical properties of silicon nanowires
Dmitri Migas, Belarusian State University of Informatics and RadioElectronics, Belarus

15.30 – 15.50 – Oral

Electronic and magnetic structure of zigzag graphene nanoribbons: quantum chemical calculations
Nikolai Poklonski, Belarusian State University, Belarus

15.50 – 16.30 – Coffee Break

Electromagnetic shielding I (ISTC Workshop).

Session chair: **Nikolai Gaponik, Technical University of Dresden, Germany**

16.30 – 16.50 – Oral

Electrical Conductivity of single-wall carbon nanotubes films
Vitaly Ksenevich, Belarusian state University, Belarus

16.50 – 17.10 – Oral

Band structure of all-boron 2D metallic crystal as a prospective electromagnetic shielding material
Levan Chkhartishvili, Georgian Technical University, Georgia

Physical Department BSU (Nezavisimosti Ave., 2)

Nanostructures synthesis and characterization I (ISTC Workshop)

Session Chair: **Vitaly Ksenevich, Belarusian State University, Belarus**

14.30 – 14.50 – Oral

Direct chemical vapour deposition of semitransparent pyrolytic carbon film
Tommi Kaplas, University of Eastern Finland, Finland

14.50 – 15.10 – Oral

Peculiarities of carbon nanofibres obtained by PECVD
Sergey Fisenko, A.V.Luikov Heat and Mass Transfer Institute of NAS, Belarus

15.10 – 15.30 – Oral

Nanostructuring of Si-based alloy layers induced by fast recrystallization
Peter Gaiduk, Department of Physical Electronic and Nanotechnology, Belarusian State University, Belarus

15.30 – 15.50 – Oral

Properties of systems with carbon nanotubes based on the swift heavy ion track technology
Alexandre Petrov, Scientific-Practical Materials Research Center NAS Belarus, Minsk, Belarus

15.50 – 16.30 – Coffee Break (Red House (Rectorat), Bobruiskaya Str. 5)

Nanostructures synthesis and characterization II (ISTC Workshop)

Session Chair: **Vladimir Kuznetsov, Boreskov Institute of Catalysis, Russia**

16.30 – 16.50 – Oral

SERS substrates on the base of semiconductor self-assembled quantum dots Ge-on-Si nanostructures to characterize inorganic microcrystals
Elena Klyachkovskaya, B.I. Stepanov Institute of Physics NASB, Belarus

16.50 – 17.10 – Oral

Magnetic properties of Gd-based nanocomposites prepared by laser assisted techniques

Nikolai Tarasenko, B.I. Stepanov Institute of Physics, Belarus

Physical Department BSU (Nezavisimosti Ave., 2)

Poster session I.

Session Chair:

Leonid Chernozatonskii, Institute of Biochemical Physics, Russian Academy of Sciences, Russia

17.10 – 19.00

1. Rabi chain based terahertz nanoantennas,

Yauhen Yerchak, Belarusian State University, Belarus

2. Quantum Chemical Simulation of the Structure of the Endohedral Buckminsterfullerene Derivatives

Alexander Pushkarchuk, Institute for Nuclear Problems, Belarus

3. $C_{60}(FeCp_2)_2$ based composition material for the potential medical application

Alexander Pushkarchuk, Institute for Nuclear Problems, Belarus

4. Two level system dynamics modelling near real nano- and microstructures

Alex Maloshtan, Institute of Physics NASB, Belarus

5. Self Amplified Spontaneous Emission in carbon nanotubes and graphene

Sofia Voronovich, Research Institute for Nuclear Problems, Belarus

6. Electron band structure of carbon nanotubes intercalated copper

Ilya Bochkov, Ryazan state radio engineering university, Russia

7. Functionalized SNOM-probes with nanodiamond crystals hosting nitrogen-vacancy color-centers

Dmitry Filimonenko, B. I. Stepanov Institute of Physics, NASB, Belarus

8. Influence of electromagnetic radiation on an array of carbon nanotubes in the presence of electric nanosecond impulses

Nail Sadykov, Snezhinsk institute of physics and technology – branch of National Research Nuclear University “MEPHI”, Russia

9. Cluster Embedding Method for Quantum-Chemical Simulation of Nanodevices

Emma Shidlovskaya, Information Systems Management Institute, Riga, Latvia

10. Hardware-software system for studying the properties of magnetic shields and electrical products based on film and composite nanostructures

Siarhei Hryshyn, B. I. Stepanov Institute of Physics, NASB, Belarus

11. Numerical analysis of the electrical conduction in carbon nanostructures

Mikhail Britch, Heat and Mass Transfer Institute, NASB, Belarus

12. Non-plasmonic hyperthermia: prerequisites for realization and materials

Kamil Moldosanov, Kyrgyz-Russian Slavic University, Kyrgyzstan

13. A simple way for the passive THz imaging
Kamil Moldosanov, Kyrgyz-Russian Slavic University, Kyrgyzstan
14. Isomeric transition of C₁₀ molecule from star to ring conformations
Sergey Radkevich, Belarusian State University, Belarus
15. Dynamical diffraction theory of waves in photonic crystals built from anisotropically scattering elements
Evgeny Gurnevich, Research Institute for Nuclear Problems, Belarus
16. Plasmon-enhanced luminescence of fluorescein-labeled biomolecules on top of silver nanostructures
Andrei Ramanenka, Belarusian State University, Belarus
17. Size and temperature dependence of the surface plasmon resonance in silver nanoparticles
Oleg Yeshchenko, Physics Department, National Taras Shevchenko Kyiv University, Ukraine
18. Modelling of a magnetic resonance in nanoparticles array
Aliaksandr Andreyenka, Belarusian State University of Informatics and Radioelectronics, Belarus
19. Design of high-pass multiband multilayer filter for Raman
Sergey Kozhukh, B.I. Stepanov Institute of Physics, NASB, Belarus
20. Luminescence properties of biological molecules infiltrated in synthetic opal
Vitaliy Boyko, Institute of Physics of NAS of Ukraine, Ukraine
21. Anomalous retroreflection from strongly absorbing nanoporous semiconductors
Sergey Prislowski, B. I. Stepanov Institute of Physics, NASB, Belarus
22. Comparative electrooptical response from zero-, one, and two-dimensional CdSe nanocrystals
Anatol Prudnikau, Institute for Physico-Chemical Problems of Belarussian State University, Belarus
23. Main properties of effective dimensional reduction for relativistic Dirac particles
Alexander Silenko, Research Institute for Nuclear Problems, Belarus
24. Numerical simulation of surface plasmons in Si/SiGe layers with incorporated nanoholes and metallic nanoparticles
Viktoryia Shautsova, Belarusian State University, Belarus
25. Synthesis and physicochemical properties of composites on the based iron- and cobaltcontaining nanoparticles and polymers for electromagnetic shielding
Gleb Yurkov, Baikov Institute of Metallurgy and Materials Science, RAS, Russia

19.00 – 21.00 – Welcome party (Red House, ground floor, canteen)

Wednesday, May 23

Red House (Rectorat), Bobruiskaya Str. 5A

General session III.

Session Chair:

**Akhlesh Lakhtakia, Pennsylvania State University,
USA**

09.00 – 09.45 – Key Lecture

Enhanced light-matter interaction in plasmonic nanostructures

Sergey Gaponenko, Stepanov Institute of Physics, Belarus

09.45 – 10.05 – Invited Speaker

Fluorescent nanodiamonds of diverse origin

Igor Vlasov, General Physics Institute, RAS, Russia

10.05 – 10.30 – Oral Presentation

Expanding possibilities for investigating of chemical composition with m-XRF spectrometer M4 TORNADO from Bruker. AXS

Evgenia Onoprienko, OPTEC LLC, Ukraine

10.30 – 11.00 – Coffee-Break

General session IV.

Session Chair:

Philippe Lambin, University of Namur, Belgium

11.00 – 11.30 – Invited

Colloidal Nanocrystal Architectures for Nanophotonics

Nikolai Gaponik, Physical Chemistry, TU Dresden, Germany

11.30 – 12.00 – Invited

Resonant energy transfer in the complexes of semiconductor nanocrystals and organic dye molecules

Mikhail Artemyev, Institute for Physico-Chemical Problems of Belarussian State University, Belarus

12.00 – 12.30 – Invited

Magic-number nanocrystals by chemical methods and their potential applications

Pawan K. Khanna, Defence Institute of Advanced Technology (DIAT), Girinager, India

12.30 – 12.50 – Oral

Studies of Complex Materials with Hot Neutrons

Alexandre` Ivanov, Institut Laue-Lamgevin, Grenoble, France

Institute for Nuclear Problems, Bobruiskaya Str. 11, room, 310

12.00 – 12.45 – ISTC project B-1708, consortium meeting

12. 50 – 14.30 – Lunch break

Red House (Rectorat), Bobruiskaya Str., 5A

Optical & electromagnetic properties of nanostructures I

Session Chair:

**Sergei Mingaleev, VPI Development Center, Belarus
High Tech Park, Belarus**

14.30 – 14.50 – Oral

Electromagnetic shielding efficiency in Ka-band: carbon foam versus epoxy resin nanocomposites

Polina Kuzhir, Research Institute for Nuclear problems of Belarusian State University, Belarus

14.50 – 15.10 – Oral

Broadband dielectric spectroscopy of carbon nanotubes composites

Jan Macutkevici, Center for Physical Sciences and Technology, Lithuania

15.10 – 15.30 – Oral

Effect of nitrogen doping on the polarizability of carbon nanotubes

Lyubov Bulusheva, Nikolaev Institute of Inorganic Chemistry, Siberian Branch of RAS, Russia

15.30 – 15.50 – Oral

Simulation of Electromechanical Properties of Ordered Carbon Nanotube Arrays

Viatcheslav Barkaline, Belarusian National Technical University, Belarus

15.50 – 16.30 – Coffee Break

Optical & electromagnetic properties of nanostructures II

Session Chair:

**Lyubov Bulusheva, Nikolaev Institute of Inorganic
Chemistry, Russia**

16.30 – 16.50 – Oral

Photo- and Electroluminescence CdS/CNT Hybrids

Alexander Okotrub, Nikolaev Institute of Inorganic Chemistry SB RAS, Russia

16.50 – 17.10 – Oral

Forming electronic waveguides from graphene grain boundaries,

Geza Mark, Institute for Technical Physics and Materials Science, Hungary

17.10 – 17.30 – Oral

Graphene quantum dots: structures, properties, electronic and optic applications

Leonid Chernozatonskii, Institute of Biochemical Physics, RAS, Russia

17.30 – 17.50 – Oral

Electrical and magnetotransport in vertically oriented magnetically functionalized carbon nanotubes arrays

Ivan Komissarov, Belarusian State University of Informatics and RadioElectronics, Belarus

Physical Department BSU

Perspectives of biomedical applications.

Session chair:

**Peter Belobrov, Institute of Biophysics SB RAS ,
Siberian Federal University, Russia**

14.30 – 14.50 – Oral

Surface enhanced spectroscopy in science and medicine

*Galyna Dovbeshko, Institute of Physics of National Academy of Science of Ukraine,
Ukraine*

14.50 – 15.10 – Oral

Localized plasmon resonance in composite materials containing single-wall carbon nanotubes: theory and experiments

Mikhail Shuba, Research Institute for Nuclear Problem, Belarus

15.10 – 15.30 – Oral

Ag nanoparticles induce stress reactions in higher plants

Vadim Demidchik, Belarusian State University, Belarus

15.30 – 15.50 – Oral

Comparative analysis of the effect of enhancement of IR signals of biomolecules adsorbed on single wall carbon nanotubes and graphene nano plates

Anna Rynder, Institute of Physics of NASU and National University of "Kyiv-Mohyla Academy", Ukraine

15.50 – 16.30 – Coffee Break

Electromagnetics & Plasmonics.

Session Chair:

Mikhail Portnoi, University of Exeter, United Kingdom

16.30 – 16.50 – Oral

Electrodynamics of Multiwall Carbon Nanotubes with Intershell Tunneling

*Giovanni Miano, Department of Electrical Engineering, University of Naples Federico II,
Italy*

16.50 – 17.10 – Oral

Plasmon polariton slowing down in graphene structures

Konstantin Batrakov, Research Institute for Nuclear Problems, Belarus

17.10 – 17.30 – Oral

Pulling nanoparticles by a non-diffractive light beam

Andrey Novitsky, Technical University of Denmark, Denmark

17.30 – 17.50 – Oral

Angle-dependent excitation of surface plasmon polaritons in gold nanowires in alumina

Oleg Yeshchenko, National Kyiv Taras Shevchenko University, Ukraine

Thursday, May 24

Red House (Rectorat), Bobruiskaya Str. 5A

General session V.

Session Chair:

**Pawan K. Khanna, Defence Institute of Advanced
Technology, India**

09.00 – 09.45 – Key Lecture

Towards Single Photon Sources at Room Temperatures for Quantum Cryptography
Application

Axel Hoffmann, Institut für Festkörperphysik, Technische Universität Berlin, Germany

09.45 – 10.30 – Key Lecture

Solid-state based room temperature terahertz imaging systems

Gintaras Valusis, Center for Physical Sciences and Technology, Lithuania

10.30 – 11.00 – Coffee-Break

General session VI.

Session Chair:

**Gintaras Valusis, Center for Physical Sciences and
Technology, Lithuania**

11.00 – 11.30 – Invited

Nonlocal analysis of natural and artificial materials using a transport formulation

George W. Hanson, University of Wisconsin-Milwaukee, USA

11.30 – 12.15 – Key lecture

Concept of photonic density of states in nanoelectromagnetics: theory and applications

Gregory Slepyan, Research Institute for Nuclear Problems, Belarus

12.15 – 12.45 – Invited

Nonlinear optical phenomena in planar microcavities

*Ivan Shelykh, Division of Physics and Applied Physics, Nanyang Technological
University, Singapore*

Institute Nuclear Problems, Bobruiskaya Str. 11, room 310

12.00 – 12.45 – EU FP7 BY-NANOERA project, consortium meeting

12.45 – 14.30 – Lunch break

Red House (Rectorat), Bobruiskaya Str. 5A

General session VII.

Session Chair:

**Stefano Bellucci, INFN-Laboratori Nazionali di
Frascati, Italy**

14.30 – 15.00 – Invited

Single NV Centers in Nanostructured Diamond for Quantum Informatics and Quantum Magnetometry

Sergey Kilin, B.I. Stepanov Institute of Physics NASB, Minsk, Belarus

15.00 – 15.30 – Invited

QED in 5 nm diamond ball with floating electron

Peter Belobrov, Siberian Federal University & Institute of Biophysics SB RAS, Russia

15.30 – 15.50 – Oral

Multiphoton Resonant Excitation of Fermi-Dirac Sea in Graphene at the Interaction with Strong Laser Fields

Hamlet Avetissian, Centre of Strong Fields Physics, Yerevan State University, Armenia

15.50 – 16.20 – Coffee-Break

General session VIII.

Session Chair:

Yuri Svirko, University of Eastern Finland, Finland

16.20 – 16.40 – Oral

Atomistic simulations of defect containing tubular nanostructures

Stefano Bellucci, INFN-Laboratori Nazionali di Frascati, Italy

16.40 – 17.00 – Oral

Reflectance properties of nanocarbons: nanodiamond (ND), sp²/sp³ composites, onion-like carbon and multiwalled carbon nanotubes

Vladimir Kuznetsov, Boreskov Institute of Catalysis SB RAS, Russia

Physical Department BSU

Poster session II.

Session Chair:

Polina Kuzhir, Institute for Nuclear Problems, Belarus

17.00 – 18.45

1. Insight into multishell carbon nanostructure electrostatic response

Olga Sedelnikova, Nikolaev Institute of Inorganic Chemistry, Russia

2. Electromagnetic properties of thermoplastic polymer composites containing carbon nanoparticles in frequency range 10 MHz- 1.5 THz

Valentin Suslyayev, National Research Tomsk State University, Russia

3. Anisotropic properties of MWCNT/polystyrene composite films in terahertz region

Dzmitry Bychanok, Research Institute for Nuclear Problems, Belarus

4. BC₃ nanotubes: electronic and structural properties

Sergey Boroznin, Volgograd State University, Russia

5. Influence of metal superlattice to boron nanotube
Evgeniya Perevalova, Volgograd State University, Russia
6. Heat resistant phosphate materials containing pure and nitrogen- and boron-doped carbon nanotubes: effectiveness of electromagnetic interference shielding in microwave
Artyom Plyushch, Research Institute for Nuclear Problems, Belarus
7. Investigation of the interaction of certain polymers and carbon nanotubes
Aleksey Krutoyarov, Volgograd State University, Russia
8. Carbon nanotubes as a new material for the purification of alcohol-containing liquids
Irina Zaporotskova, Volgograd State University, Russia
9. Effect of buckypaper properties on attenuation of electromagnetic radiation
Roman Krivosheev, Belarusian State University, Belarus
10. Electrical and magnetic properties of thin films of cross-linked fullerene C60 polymers in micro- and nano-scale
Ihar Razanau, Belarusian State University of Transport, Belarus
11. Optical characterisation of nanostructured composite formed by Ag⁺ implantation into polyethyleneterephthalate
Vlas Volobuev, Belarussian State University, Belarus
12. Surface plasmon resonance in silver nanoparticles formed in polyimide by ion implantation
Andrei Kharchanka, Belarusian State University, Belarus
13. Interaction of Aligned Carbon Nanotube Arrays with the Electromagnetic Radiation of the 78-118 GHz Frequency Range
Alena Prudnikava, Belarusian State University of Informatics and Radioelectronics, Belarus
14. Dielectric properties of lead-barium zirconate titanate, alloyed with copper and nickel
Alesia Paddubskaya, Research Institute for Nuclear Problems, BSU, Belarus
15. Reorientation of magnetization in a single-domain cobalt particle by a laser beam
Andrey Kukharev, Belarusian State University of Informatics and Radioelectronics, Belarus
16. Modified flame pyrolysis method for magnetic nanoparticles synthesis
Dzmitry Kotsikau, Belarusian State University, Belarus
17. Formation of the EM-absorbing polymer films
Irina Larionova, Technological Center "Nanoplan", Russia
18. Method of vacuum deposition of carbon nanotube thin film nanocomposites
Yegor Tamashevich, Belarusian State University of Informatics and Radioelectronics, Belarus
19. Ag Displacement Deposition on Porous Silicon for SERS Substrate Fabrication
Ksenya Artsemyeva, Department of Micro- and Nanoelectronics, BSUIR, Belarus

20. Ion Beam Synthesis And Characterization Of A3b5 Nanocrystals In Si And SiO₂/Si For Optoelectronic Systems

Maksim Makhavikou, Belarusian State University, Belarus

21. Characterization of ferromagnetic metal-carbon nanocomposites prepared by solid-phase pyrolysis of metall-phthalocyanine

Tatevik Khachatryan, Institute for Physical Research, National Academy of Sciences, Armenia

22. Development of anisotropic composite materials for electromagnetic applications

Mikhail Kanygin, Nikolaev Institute of Inorganic Chemistry, Russia

23. Fabrication and characterization of Er- and Gd-implanted tin dioxide films

Vitaly Ksenevich, Department of Physics, Belarusian State University, Belarus

24. Bistable states of 5-7 defects in grapheme

Anatoliy Vlassov, Department of Physics, Belarusian State University, Belarus

25. Effect of annealing and biaxial deformation on the dielectric properties of composites of multiwall carbon nanotubes and poly(ethylene terephthalate)

J. Macutkevicius, Vilnius University, Lithuania

26. Ultrasensitive detector of modulated terahertz radiation based on double-carbon nanotube system

V. Semenenko, Moscow Institute of Physics and Technology, Russia

Institute Nuclear Problems, Bobruiskaya Str. 11, room 310

17.00 – 17.45 – EU FP7 FAEMCAR project, kick-off meeting

Cafe BSU "Gaudeamus", Oktyabrskaya Str., 10

19.00 – 22.30 Conference reception

Friday, May 25

Red House (Rectorat), Bobruiskaya Str. 5A

General session IX.

Session Chair:

**Ivan Shelykh, Nanyang Technological University,
Singapore**

09.00 – 09.30 – Invited

EU programmes for research and innovation- FP7 and Horizon 2020- : cooperation opportunities

Thierry Devars, European Commission, Belgium

09.30 – 09.50 – Oral

Time Dependence of the Intensity of Parametric (Quasi-Cherenkov) Radiation Produced by Relativistic Particles Passing Through Photonic Crystals

Sergei Anishchenko, Research Institute for Nuclear Problems, Belarus

09.50 – 10.10 – Oral

The electrodynamic modeling of nanostructures and metamaterials on the basis of the method of minimal autonomous blocks

Sergey Maly, Belarusian state university, Belarus

10.10 – 10.30 – Oral

Nanoscale investigation of microstructure effects on hydrogen behaviour in rapidly solidified aluminium alloys

Iya Tashlykova-Bushkevich, Belarusian State University of Informatics and Radioelectronics, Belarus

10.30 – 11.00 – Coffee-Break

Electromagnetic shielding II (ISTC Workshop)

Session Chair:

Alexander Okotrub, Nikolaev Institute of Inorganic Chemistry, Russia

11.00 - 11.20 – Oral

Glasses with PbS and PbSe nanoparticles as saturable absorbers for mode-locked solid state lasers

Valerij Gurin, Research Institute for Physical Chemical Problems of Belarusian State University, Belarus

11.20 – 11.40 – Oral

Local field effects and interference quenching of light in planar plasmonic nanostructures

Svetlana Kachan, Belarusian National Technical University, Belarus

11.40 – 12.00 – Oral

Microwave absorption by magnetic nanocomposite of disordered carbon nanotubes arrays

Alexander Danilyuk, Belarusian State University of Informatics and Radioelectronics, Belarus

General discussion on closing the conference

Moderators:

Aleg Ivashkevich, Belarusian state University, Belarus

Sergey Maksimenko, Institute for Nuclear Problems BSU, Belarus

12.00 – 13.00

