



**19th International Workshop
on New Approaches to High-Tech:
Nano-Design, Technology, Computer Simulations
Dedicated to Professor A.L. Sanin**

October 28–29, 2021 | Minsk, Belarus

PROGRAM

Organizers



Belarusian State University
of Informatics and Radioelectronics



MIREA – Russian Technological University

Partners



OCTOBER 28, 2021

09:00-09:30 Registration (offline)

Place: Belarusian State University of Informatics and Radioelectronics,
office No. 203, 10, P. Brovki street, Minsk, Belarus

Live broadcast on YouTube: <https://youtu.be/GDkrbNklXgE>

09:30-10:00 OPENING CEREMONY

Greetings to the symposium participants

Viktor Stempitsky

Vice-Rector for R&D, Belarusian State University of Informatics and Radioelectronics, Belarus

“LG Electronics – the way of innovations”

Yury Timoshkov

Official representative of LG Electronics Inc. in Belarus, Leading Researcher, Belarusian State University of Informatics and Radioelectronics, Belarus

10:00-12:00 PLENARY SESSION

“The world of information technologies”

Vladimir Labunov

Belarusian State University of Informatics and Radioelectronics, Belarus

“Areas and perspectives of JSC INTEGRAL collaboration with research centers and universities in micro- and nanoelectronics”

Anatoly Belous

Deputy General Director of JSC “Integral” – Management Company of “Integral” Holding, Belarus

“3D, 2D and 1D in silicon, silicides and transition metal oxides: *ab initio* prediction of unexpected properties”

Dmitry Migas

Belarusian State University of Informatics and Radioelectronics, Belarus

“Analysis of strain in physical vapour deposited Bi₂Se₃ thin films based on correlation of Raman active vibration modes”

Ivan Komissarov

Belarusian State University of Informatics and Radioelectronics, Belarus

12:15-12:30 Coffee break

12:30-14:00 SESSION 1

“Silicon carbide membranes for microelectromechanical systems based CMUT with influence factors”

M. Pal, R. Maity, N. Maity

Mizoram University, India

“Maxwell electrodynamics in media, geometry effects on constitutive relations”

N. Krylova¹, E. Ovsyuk², A. Ivashkevich³, V. Red'kov³

¹ Belarusian state agrarian technical university, Belarus

² Mozyr State Pedagogical University, Belarus

³ B.I. Stepanov Institute of Physics of the National Academy of Science of Belarus, Belarus

“Electrodynamics, complex rotation group, media”

A. Ivashkevich¹, V. Red'kov¹, V. Kisel²

¹ B.I. Stepanov Institute of Physics of the National Academy of Science of Belarus, Belarus

² Belarus State University of Informatics and Radioelectronics, Belarus

“Effect of thermal treatment on the electrical and photovoltaic characteristics of methylammonium lead triiodide perovskite films”

I. Vrublevsky¹, A. Tuchkovsky¹, N. Lushpa¹, Pham Gia Vu², Tran Dai Lam²

¹ Belarusian State University of Informatics and Radioelectronics, Belarus

² Institute for Tropical Technology, Vietnam Academy of Science and Technology, Vietnam

“Electrically confined graphene quantum dots: theoretical treatment”

H. Grushevskaya, G. Krylov

Belarusian State University, Belarus

“Plasmonic enhancement of luminescence efficiency in light emitting structures”

O.S. Kulakovich

B.I. Stepanov Institute of Physics, National Academy of Sciences of Belarus, Belarus

“Emission enhancement of semiconductor nanocrystals by gold nanorods”

L. Trotsiuk¹, A. Muravitskaya², O. Kulakovich¹, M. Artemyev³, S. Gaponenko¹

¹ B.I. Stepanov Institute of Physics, National Academy of Sciences of Belarus, Belarus

² University of Hull, United Kingdom

³ Research Institute for Physico-Chemical Problems of Belarusian State University, Belarus

14:00-15:00 Lunch break

15:00-17:15 SESSION 2

“Circular photovoltaic effect in an anisotropic graphene superlattice in the presence of a constant electric field”

P. Badikova, D. Zav'yalov, D. Zharikov

Volgograd State Technical University, Russia

“Development of a package for automating the pipeline processing of quantum-chemical calculations using GAMESS on a cluster with a Slurm queuing system”

N. Demidovich, D. Zav'yalov, A. Polikarpova

Volgograd State Technical University, Russia

“Developing a Seq2Seq neural network using visual attention to transform mathematical expressions from images to LaTeX”

P. Vyaznikov, I. Kotilevets

MIREA – Russian Technological University, Russia

“Influence of supply voltage on the velocity of flight of domains in a Gunn diode”

G. Kostrov, D. Zav'yalov

Volgograd state technical university, Russia

“Photoacoustic effect in micro- and nanostructures: numerical simulations of lagrange equations”

O. Romanov, Ya. Shtykov, I. Timoshchenko

Belarusian State University, Belarus

“The effect of a high-frequency electromagnetic field on the breather-electric effect in a non-additive superlattice”

D. Zavyalov, E. Sivashova, E. Denisov

Volgograd State Technical University, Russia

17:15-17:30 Closing remarks

OCTOBER 29, 2021

**11:00-13:00 ONLINE SESSION ON TEACHING TECHNOLOGIES
IN MATHEMATICAL MODELLING**

Place: MIREA – Russian Technological University, Russia

Live broadcast on Webinar.ru: <https://events.webinar.ru/21583066/9396229>

“Software tool for evaluation of reliability and survivability of complex technical system bases on logical-probabilistic methodology”

V. Skobtsov¹, N. Lapitskaja²

¹ United Institute of Informatics Problems, National Academy of Sciences of Belarus, Belarus

² Belarusian State University of Informatics and Radioelectronics, Belarus

“Integration of general physics experiments with mathematical simulation”

I. Zeylikovich, A. Nikitin, A. Belko

Yanka Kupala State University of Grodno, Belarus

“Model of lossy layered systems”

Y. Hudak, D. Parfenov, A. Beskin, I. Dragileva

MIREA – Russian Technological University, Russia

“Representation of a transmission model with continuous power flow in state space”

A. Asanov, E. Guryanova

MIREA – Russian Technological University, Russia

“Delaunay variables in model problems of celestial mechanics and cosmodynamics”

A. Shatina, A. Cheshkova

MIREA – Russian Technological University, Russia

“Forecasting the level of assimilation of mathematical knowledge as a stage in modeling the educational process of a university in a blended learning environment”

E. Zhuravleva, L. Studenikina

MIREA – Russian Technological University, Russia

“Calculation of the damping of photoinduced dynamics of magnetization for energy-efficient magneto-optical memory devices”

S. Ovcharenko

MIREA – Russian Technological University, Russia

“Optical sensor devices modeling using the Comsol Multiphysics software package”

S. Lavrov

MIREA – Russian Technological University, Russia

“Mathematical modeling of the dynamics of a four-point platform of a heavy-duty vehicle”

A. Verkner, A. Asanov

MIREA – Russian Technological University, Russia

“Parameters of load testing models: approaches to estimation”

A. Markov, A. Paramonov

Belarusian State University of Informatics and Radioelectronics, Belarus

“Using the Comsol Multiphysics software to simulate the parameters of THz antennas”

A. Buryakov

MIREA – Russian Technological University, Russia

“Modeling of temperature and mechanical stress distribution during femtosecond pulsed laser annealing of ferroelectric films”

A. Elshin

MIREA – Russian Technological University, Russia

“Modeling the band structure of two-dimensional transition metal dichalcogenides”

N. Pimenov

MIREA – Russian Technological University, Russia

“Time series analysis of water pollution data”

I. Drozdov

MIREA – Russian Technological University, Russia

“Mathematical simulation of the spatial spread of COVID-19 waves in Russia”

V. Aristov^{1,2}, A. Stroganov², A. Yastrebov

¹ Dorodnitsyn Computing Center of Federal Research Center “Computer Science and Control” of Russian Academy of Sciences, Russia

² MIREA – Russian Technological University, Russia

“Comparison of hybrid approaches in classification using decision trees and neural networks”

A. Fomchenko

MIREA – Russian Technological University, Russia

“3D cave model with sparse data”

N. Lomov, A. Shelepin

MIREA – Russian Technological University, Russia

“Determination of quality indicators of controlled electric drives at the design stage by the method of circuit simulation”

V. Sleptsov, A. Ablaeva

MIREA – Russian Technological University, Russia

“Simulation of some security tasks for secure telecommunications using a quantum-computing simulator in one of the quantum programming languages”

A. Kryuchkov, A. Korolkov

MIREA – Russian Technological University, Russia

“Destruction processes in power plants as a practical example for the course of mathematical modeling”

V. Kulagin, A. Alexandrov

MIREA – Russian Technological University, Russia

“Distance learning as an imperative for digitalization of education”

M. Beskhmel'nov, N. Shmeleva, S. Shilkov, M. Lygarev

MIREA – Russian Technological University, Russia

“On the restoration of the blurred image of a moving object”

V. Feodorov, S. Harlamov

MIREA – Russian Technological University, Russia

“Machine learning methods for evaluating innovative projects”

A. Shmeleva, I. Goldobin, E. Klimova, A. Moskvina, Y. Lygarev

MIREA – Russian Technological University, Russia

“Effectiveness indicators of modeling the air situation”

R. Shatovkin, Y. Parshenkova, V. Filatov

MIREA – Russian Technological University, Russia

“Methodology for assessing the effectiveness of modeling the air situation”

R. Shatovkin, A. Rusakov, B. Anufriev

MIREA – Russian Technological University, Russia

“Analytical-simulation modeling of the air situation”

R. Shatovkin, O. Trubienko, A. Khudyakov

MIREA – Russian Technological University, Russia

“Answer assessment system with respondent identification”

N. Gazanova

MIREA – Russian Technological University, Russia

“New technical possibilities of radiofrequency systems”

V. Makarov

MIREA – Russian Technological University, Russia

“Reflection of regular functions and periodicity”

A. Pavlov

MIREA – Russian Technological University, Russia

“Monte Carlo method for option pricing under variable volatility”

A. Lobuzov

MIREA – Russian Technological University, Russia

13:00-14:00 Lunch break

14:00-16:00 SESSION 3

Place: Belarusian State University of Informatics and Radioelectronics, Belarus
office No. 203, 10, P. Brovki street, Minsk, Belarus

Live broadcast on YouTube: <https://youtu.be/MZQiztJfCCs>

“*Ab initio* calculations of electronic band structure of CdMnS semimagnetic semiconductors”

M. Mehrabova¹, N. Panahov², N. Hasanov³

¹ Institute of Radiation Problems, ANAS, Azerbaijan

² Azerbaijan University of Architecture and Construction, Azerbaijan

³ Baku State University, Azerbaijan

“Emergence of topological defects in a bilayer of multiwalled carbon nanotubes irradiated by gamma-rays”

H. Grushevskaya, A. Timoshchenko, I. Lipnevich
Belarussian State University, Belarus

“Analysis and prediction of the development of microprocessor characteristics”

I. Staroverov, R. Dzerzhinsky
MIREA – Russian Technological University, Russia

“*Ab-initio* simulation of hydrogenated graphene properties”

V. Murav'ev, V. Mishchenka
Belarussian States University of Informatics and Radioelectronics, Belarus

“The effect of the electromagnetic radiation wavelength on the near-field characteristics of finite-length dielectric cylinders”

V. Kovtun-Kuszhel, M. Bachko, Ya. Drobatau
Yanka Kupala State University of Grodno, Belarus

“Study of the influence of temperature and load on the mechanical properties of unirradiated and irradiated plexiglass of different types in the flat straight bending test”

A. Kupchishin^{1,2}, M. Niyazov¹, B. Taipova¹, D. Utepova¹, B. Tronin¹

¹ Abai Kazakh National Pedagogical University, Kazakhstan

² Al-Farabi Kazakh National University, Kazakhstan

16:00-16:15 Closing remarks

POSTER SESSION

Note: Posters are uploaded to the workshop website: <https://ndtcs2021.bsuir.by/en/poster-session>.
Participants are encouraged to reach out to the authors of posters via email.

“Information-statistical approach to inverse optical problem solution for 3D disperse systems with nano and micro particles”

A. Bezrukova¹, O. Vlasova²

¹ St. Petersburg Academy of Sciences on Strength Problems, Peter the Great St. Petersburg Polytechnic University, Russia

² Institute of Biomedical Systems and Biotechnology, Peter the Great St. Petersburg Polytechnic University, Russia

“KCC-invariants-based geometrization of a theory of electromagnetic and spinor fields on the background of the Schwarzschild spacetime”

N. Krylova¹, V. Red'kov²

¹ Belarussian State Agrarian Technical University, Belarus

² B.I.Stepanov Institute of Physics of the National Academy of Science of Belarus, Belarus

“Energy levels of electron in circular quantum dot in the presence of spin-orbit interactions”

A. Baran, V. Kudryashov

B.I.Stepanov Institute of Physics of the National Academy of Science of Belarus, Belarus

“Temperature dependence of the thermal conductivity of wurtzite aluminum nitride, gallium nitride and aluminum-gallium nitride”

V. Volcheck, D. Hvazdouski, M. Baranava, V. Stempitsky

Belarussian State University of Informatics and Radioelectronics, Belarus

“Design optimization of the gallium nitride heterostructure field-effect transistor with a graphene heat-removal system”

V. Volcheck, I. Lovshenko, V. Stempitsky

Belarusian State University of Informatics and Radioelectronics, Belarus

“Atom species energy dependence on magnetic configurations in the perovskite yttrium orthoferrite”

A. Baglov^{1,2}, L. Khoroshko^{1,2}

¹ Belarusian State University of Informatics and Radioelectronics, Belarus

² Belarusian State University, Belarus

“Computer simulation of modal characteristics of photonic crystalline fibers with a layered coating”

D. Ponkratov¹, E. Chudakov¹, A. Sotsky¹, V. Minkovich²

¹ Mogilev State A. Kuleshov University, Belarus

² Centro de Investigaciones en Optica, Mexico

“Charging properties of the silicon/zinc oxide nanoparticle heterostructure”

A. Kuraptsova, A. Danilyuk

Belarusian State University of Informatics and Radioelectronics, Belarus

“Tunneling and magnetoresistance in ferromagnet/wide-gap semiconductor/ferromagnet nanostructure”

T. Sidorova, A. Danilyuk

Belarusian State University of Informatics and Radioelectronics, Belarus

“Modeling of optical properties of hybrid metal-organic nanostructures”

A. Ponyavina, K. Barbarchyk, A. Zamkovets, S. Tikhomirov

B. I. Stepanov Institute of Physics of the National Academy of Sciences of Belarus, Belarus

“Minimizing the influence of temperature changes in the environment on the performance criteria of thermo optical processor based on Fabri-Perot and Smith microresonator”

V. Zalessky, A. Konoiko, V. Kravchenko, A. Kuzmitskaya

State Scientific and Production Association “Optics, Optoelectronics and Laser Technology”, Belarus

“Modeling AlGaIn p-i-n photodiodes”

N. Vorsin, A. Gladyschchuk, T. Kushner, N. Tarasiuk, S. Chugunov, M. Borushko

Brest State Technical University, Belarus

“Study of photonic nanojets in the diffraction wave fields of complex-shape dielectric particles”

A. Rudnitsky, N. Poleschuk

Belarusian State University, Belarus

“Machine learning methods for predict electrophysical properties of semiconductor materials for optoelectronic and energy storage devices”

A. Khinevich, A. Stsiapanau, A. Smirnov

Belarusian State University of Informatics and Radioelectronics, Belarus

“Influence of radiation exposure on the properties of dielectric layers based on anodic aluminum oxide”

S. Biran, D. Korotkevich, A. Korotkevich, K. Garifov, A. Dashkevich

Belarusian State University of Informatics and Radioelectronics, Belarus

“Effects of technological regimes and surface morphology on wettability properties of porous Al₂O₃ coatings”

D. Shimanovich¹, D. Tishkevich², A. Vorobjova¹, A. Trukhanov²

¹ Belarusian State University of Informatics and Radioelectronics, Belarus

² Scientific-Practical Materials Research Centre of National Academy of Sciences of Belarus, Belarus

“The comparative analysis of technological regimes for improving the electrical insulation strength of double-sided alumina bases with vias”

D. Shimanovich¹, D. Tishkevich²

¹ Belarusian State University of Informatics and Radioelectronics, Belarus

² Scientific-Practical Materials Research Centre of National Academy of Sciences of Belarus, Belarus

“Computer modeling of cascade probabilistic functions, energy spectra of PKA and concentration of vacancy clusters in materials irradiated with light ions”

N. Voronova¹, A. Kupchishin¹, A. Kupchishin^{1,2}, T. Shmygaleva²

¹ Kazakh National Pedagogical University named after Abai, Kazakhstan

² Kazakh National University named after al-Farabi, Kazakhstan

“Simualtion of radiation damage of the semiconductor devices”

S. Miskiewicz, A. Komarov, F. Komarov, V. Yuvchenko, G. Zayats

Institute of Applied Physics Problems, Belarus

“Photosensitive properties of avalanche LEDs based on nanostructured silicon”

S. Lazarouk, U. Dudzich, A. Klyutsky, A. Dolbik, V. Labunov

Belarusian State University of Informatics and Radioelectronics, Belarus

“Density functional theory-based study of Cu₂TiSnS₄ and Cu₂VSnS₄ for photovoltaic applications”

A. Kistanov¹, R. Botella¹, E. Korznikova², A. Smirnov³, S. Zhuk³

¹ Nano and Molecular Systems Research Unit, University of Oulu, Finland

² Institute for Metals Superplasticity Problems, Russian Academy of Sciences, Russia

³ Belarusian State University of Informatics and Radioelectronics, Belarus

“Modification of anodic alumina by laser irradiation during anodizing”

A. Poznyak¹, A. Kukhta²

¹ Belarusian State University of Informatics and Radioelectronics, Belarus

² Institute for Nuclear Problems, Belarusian State University, Belarus

“Optical properties of thin metallic nano-patterned films for display applications”

A. Hubarevich, Ya. Mukha, A. Smirnov

Belarusian State University of Informatics and Radioelectronics, Belarus

“Development of the library for 3D modeling and computer-aided design of plated knitted fabrics”

D. Bykouski, A. Charkovskij

Vitebsk State University of Technology, Belarus

“Design and simulation of 3D magnetic field sensors with integrated magnetic concentrator”

Dao Dinh Ha¹, V. Stempitsky²

¹ Le Quy Don Technical University, Vietnam

² Belarusian State University of Informatics and Radioelectronics, Belarus

“Modification of the RLA model for presenting a cluster system of a composite material with a fractal filler structure”

A. Belko, N. Babarika, I. Zeylikovich, A. Nikitin

Yanka Kupala State University of Grodno, Belarus

“Low temperature magnetoresistance in silicon doped by antimony”

A. Danilyuk, A. Trafimenko, S. Prischepa

Belarusian States University of Informatics and Radioelectronics, Belarus

“Investigation of the structure of manganese-doped silicon-carbon films obtained by electrochemical method”

T. Mikhailova, T. Myasoedova

Southern Federal University, Russia

“Plasmon effects in a graphene nanostructure”

A. Felsharuk, D. Podryabinkin, A. Danilyuk

Belarusian State University of Informatics and Radioelectronics, Belarus