



21th International Conference
Foundations & Advances in Nonlinear Science
 26.09-30.09 2022
 and
 6nd International Symposium
Advances in Nonlinear Photonics
 26.09-30.09 2022
 Minsk, Belarus

FANS & ANPh Conferences Programme

Monday 26.09.2022

FANS & ANPh REGISTRATION **9.00 – 10.00**

Physics Department, room 326

OPENING **10.00 – 10.05**

Physics Department, room 330

Foreword by Chairman Prof. Alexei Tolstik

High-energy physics **10.05 – 12.00**

Physics Department, room 330 (Chairman A. Tolstik)

10.05 – 10.35

On contributions of bubble-like diagrams to the anomalous magnetic moments of leptons (invited)

O.P. Solovtsova V.I. Lashkevich, (Gomel State Technical University, Gomel, Belarus)

10.35 – 11.00

Nonperturbative Gluon Correlations in QCD Jet

V.A. Shaparau (JIPNR-Sosny, NAS of Belarus, Minsk, Belarus)

11.00 – 11.20

Analysis of charged hadrons fluctuations in Monte Carlo simulations of heavy ion collisions with different parton energy loss models

L.F.Babichev and Y.A. Rusak (JIPNR-Sosny, NAS of Belarus, Minsk, Belarus)

11.20 – 12.00

Estimation of evolution of the reactor antineutrino spectrum using the fissile mass fractions calculation

L.F.Babichev and I.V. Rudziankou (JIPNR-Sosny, NAS of Belarus, Minsk, Belarus)

Coffee Break	12.00 – 12.10
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Physics Department, room 326

Theoretical physics	12.10 – 13.20
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Physics Department, room 330 (Chairman G. Krylov)

12.10 – 12.40

Nonrelativistic approximation in the Pauli - Fierz theory for a spin 3/2 particle in presence of external fields (invited)

A.V. Ivashkevich, V.M. Red'kov

B.I. Stepanov Institute of Physics, NAS of Belarus (Minsk, Belarus)

12.40 – 13.00

Electromagnetic field of test charge moving in the vicinity of a black hole

Komarov S. O., Gorbatsievich A. K., Vereshchagin G. V., Garkun A. S.

Belarusian State University (Minsk, Belarus)

13.00 – 13.20

Influence of magnetic field on electron energy levels in semiconductor quantum dots in the presence of spin-orbit interactions (20 minutes)

A.V. Baran, V.V. Kudryashov

B.I. Stepanov Institute of Physics, NAS of Belarus (Minsk, Belarus)

Lunch Break	13.20 – 14.30
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Nonlinear dynamics and data analysis	14.30 – 16.15
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Physics Department, room 330 (Chairman A.V. Savin)

14.30 – 15.00

Simulation of some types of vacuum electronic devices (invited)

Svetlana Sytova (Institute of Nuclear Problems of the Belarusian State University, Minsk, Belarus)

15.00 – 15.20

On One Approach to Mathematical Modeling of Socio-Economic Development of Regions

S. Chernogorskiy, K. Shvetsov, A. Zherelo (Belarusian State University, Minsk, Belarus)

15.20 – 15.50

The peculiarities of Fermi acceleration in time-dependent Tennyson-Lieberman-Lichtenberg system (invited)

D.O. Lubchenko, A.V. Savin (Saratov State University, Saratov, Russia)

15.50 – 16.10

Human emotional state at different pathological electroencephalogram patterns

A.V.Sidorenko, M.A. Saladukha (Belarusian State University, Minsk, Belarus)

16.10 – 16.35

New Methods For Processing Experimental Data In The Catalysis Field

Y.A. Mikhailov, V.G. Filippov, A.V. Elyshev (University of Tyumen, Tyumen, Russia)

Coffee Break

16.35 – 16.50

Nonlinear dynamics and data analysis

16.50 – 17.40

Physics Department, room 330 (Chairman A.Fedotov)

16.50 – 17.15

Fractional differential mathematical model of the spread of COVID-19 infection

T. Efimova, I.Timoshchenko, M. Hliatsevich, N. Abrashina-Zhadaeva (Belarusian State University, Minsk, Belarus)

17.15 – 17.40

Status of Lebesgue Measure and Additive Dimension for Birkhoff Curve

Dmitry W. Serow (State Institute of Economics, Finance, Law and Technology, Gatchina, Russia)

Tuesday 27.09.2022

Nonlinear photonics and laser dynamics

10.00 – 11.30

Physics Department, room 330 (Chairman A.Tolstik)

10.00 – 10.30

Scattering properties and exceptional points of non-Hermitian and PT-symmetric systems (invited)

A.V. Novitsky (Belarusian State University, Minsk, Belarus)

10.30 – 11.00

Photoinduced conductivity of periodical domain structures in MgO:LiNbO₃ and MgO:LiTaO₃ crystals (invited)

S.M. Shandarov, E.N. Savchenkov, A.V. Dubikov, D.E. Beletskaya, N.I. Burimov, S.V. Smirnov, M.A. Bryushinin, I.A. Sokolov, M.A. Chuvakova, A.R. Akhmatkhanov, V.Ya.Shur (Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia)

11.00 – 11.30

Tamm plasmon polaritons in one-dimensional photonic crystal covered by metasurface (invited)

I.V. Timofeev (Kirensky Institute of Physics FRC KSC SB RAS, Krasnoyarsk, Russia)

Coffee Break **11.30 – 11.45**

Nonlinear photonics and laser dynamics **11.45 – 13.15**

Physics Department, room 330 (Chairman E.A. Melnikova)

11.45 – 12.10

Coherently controlled generation of waveform-tunable unipolar pulses in a nonlinear resonant medium

A.V. Pakhomov¹, R.M. Arkhipov^{1,2}, I.V. Babushkin³, M.V. Arkhipov¹, N.N. Rosanov^{1,2} (¹St. Petersburg State University, St. Petersburg, Russia; ²Ioffe Institute, St. Petersburg, Russia; ³Leibniz University Hannover, Hannover, Germany)

12.10 – 12.35

Application of linear cellular automata in the modeling of photonic topological insulator

D.P. Fedchenko, I.V. Timofeev (Kirensky Institute of Physics FRC KSC SB RAS, Krasnoyarsk, Russia)

12.35 – 12.55

Generation of spatial rogue waves at the multimode fiber output using deep neural networks

R. Navitskaya^{1,2}, I. Stashkevich¹, S. Derevyanko², A. Karabchevsky² (¹Belarusian State University, Minsk, Belarus; ²School of Electrical and Computer Engineering, Ben-Gurion University of the Negev, Beer Sheva, Israel)

12.55 – 13.15

Liquid crystal electrically switchable optical ring resonator

Y.P. Pantsialeveva, O.S. Kabanova, E.A. Melnikova (Belarusian State University, Minsk, Belarus)

Lunch Break **13.15 – 14.30**

Materials and technologies **14.30 – 16.00**

Physics Department, room 330 (Chairman H.V. Grushevskaya)

14.30 – 15.00

Klein-tunneling resonances in quasi-circular graphene n-p-n junctions within a Majorana-like model approach (invited)

H. V. Grushevskaya, G. G. Krylov (Belarusian State University, Minsk, Belarus)

15.00 – 15.30

Kinetics of hybridization between complex DNA probe systems and DNA target on carbon nanotubes (invited)

V.P. Egorova¹, H.V. Grushevskaya², E.V. Vaskovtsev¹, N.G. Krylova³, I.V. Lipnevich² (¹Belarusian Pedagogical State University, Minsk; ²Belarusian State University, Minsk; ³Belarusian Agrarian Technical State University, Minsk)

15.30 – 16.00

Formation of materials properties in the laminate synthesis (invited, in Russian)

M.L. Kheifetz (Institute of Applied Physics NAS of Belarus, Minsk, Belarus)

Coffee Break

16.00 – 16.15

Materials and technologies

16.15 – 17.25

Physics Department, room 330 (Chairman H.V.Grushevskaya)

16.15 – 16.40

Influence of temperature fluctuations on electron dynamics in MPD setup of NICA collider

Alexander S. Fedotov, Yana Tsitavets (Belarusian State University, Minsk, Belarus)

16.45 – 17.05

Numerical simulation of the diffusion of magnetic nanoparticles in a magnetic fluid seal

S.G. Sharyna, M.S. Krakov (Belarusian State University, Minsk, Belarus; Belarusian National Technical University, Minsk, Belarus)

17.05 – 17.25

Numerical optimization of the electrophysical properties of the resistive DLC coating to improve the stability and performance of gas detectors of charged particles (for the NICA complex in Dubna)

I.A. Zur, A.S. Fedotov, A.A. Kharchanka, J.A. Fedotova and S.A. Movchan (Institute for Nuclear Problems (Minsk, Belarus); Belarusian State University, (Minsk, Belarus); Joint Institute for Nuclear Research (Dubna, Russia))

The cultural program

18.00

Wednesday 28.09.2022

Online Session**10.00 – 12.05**

Physics Department, room 330, <http://eduphys.bsu.by> (Chairman G. Krylov)

10.00 – 10.45**Daughter Higgs Boson in the Unified Composite Model (invited lecture)**

Hidezumi Terazawa (Center of Asia and Oceania for Science, Tokyo, and Midlands Academy of Business and Technology, Leicester)

10.45 – 11.15**Constraints on the mixing of Z' and W' bosons decaying into different pairings of electroweak vector bosons or Higgs bosons at the LHC (invited)**

A.A. Pankov and I.A. Serenkova (GGTU, Gomel & JINR, Dubna & ICTP Trieste)

11.15 – 11.40**Low Energy Interactions of Pseudo Scalar Mesons**

E. Avakyan, S. Avakyan (Sukhoi State Technical University of Gomel, Gomel, Belarus)

11.40 – 12.05**Nonleptonic interactions of kaons**

S. Avakyan, E. Avakyan (Sukhoi State Technical University of Gomel, Gomel, Belarus)

Technical Break**12.05 – 12.10****Online Session****12.10 – 13.50**

Physics Department, room 330, <http://eduphys.bsu.by> (Chairman O. Romanov)

12.10– 12.30**About efficient third harmonic generation in quadratic media with missing second harmonic**

O.I. Sabirov¹, G. Assanto², Usman K. Sapaev¹ (¹Tashkent State Technical University, Tashkent, Uzbekistan; ²Nonlinear Optics and OptoElectronics Lab, University “Roma Tre” (Rome, Italy)

12.30 – 12.50**On applicability of TiO₂ quantum dots to solution of optogenetics problems**

Oleg Khasanov¹, Ksenia Pistsova², Diana Klezovich², Alexey Pashkevich³, Yaroslav Gorbach² (¹Scientific-Practical Materials Research Centre, NAS Belarus, Minsk, Belarus; ²Belarusian State University, Minsk, Belarus; ³Institute for Nuclear Problems of Belarusian State University, Minsk, Belarus)

12.50 – 13.10

Optical bullets in Kerr medium in tunnel ionization regime

Olga Fedotova, Oleg Khasanov, Diana Klezovich, Ryhor Rusetsky (Scientific-Practical Materials Research Centre, NAS Belarus, Minsk, Belarus)

13.10 – 13.30

Behaviour of the solutions of a traffic flow mathematical model

M. A. Pogrebnyak (P.G. Demidov Yaroslavl State University, Yaroslavl, Russia)

13.30 – 13.50

Soliton regime of femtosecond pulse propagation in nanocomposites with semiconductor quantum dots

Oleg Khasanov¹, Olga Fedotova¹, Tatiana Smirnova², Ryhor Rysetskii¹, Artem Berestovsky³ (¹Scientific-Practical Materials Research Centre, NAS Belarus, Minsk, Belarus; ²International Sakharov Environmental Institute of Belarusian State University, Minsk, Belarus; ³Belarusian State University, Minsk, Belarus)

Lunch Break

13.50 – 15.00

Theoretical physics

15.00 – 16.25

Physics Department, room 330 (Chairman V.Red'kov)

15.00 – 15.25

Dirac particle in the generalized Newman-Unti-Tamburino space-time

N.G. Krylova (Belarusian Agrarian Technical State University, Minsk, Belarus)

15.25 – 15.45

The gauge degrees of freedom in the theory of massless spin 2 particle, solutions with spherical symmetry

A.V. Bury, A.V. Ivashkevich, A.V. Chichurin, V.M. Red'kov (B.I. Stepanov Institute of Physics, NAS of Belarus, Minsk, Belarus)

15.45 – 16.05

Internal symmetry of quantized multi-component Majorana fields

P.P. Andrusevich (The Educational Institution "Brest State College of Communications", Brest, Belarus)

16.05 – 16.25

Vector Particle with Anomalous Magnetic and Electric Quadruple Moments in Presence of Both Uniform Electric and Magnetic Fields, Solutions with Cylindrical Symmetry

A.V. Ivashkevich (B.I. Stepanov Institute of Physics, NAS of Belarus, Minsk, Belarus)

The cultural program

18.00

Thursday 29.09.2022

Nonlinear photonics and laser dynamics **10.00 – 12.05**

Physics Department, room 330 (Chairman I.V. Timofeev)

10.00 – 10.25

Ultrafast creation and control of subwavelength population gratings in a resonant medium

A.V. Pakhomov¹, R.M. Arkhipov^{1,2}, I.V. Babushkin³, M.V. Arkhipov¹, N.N. Rosanov^{1,2} (¹St. Petersburg State University, St. Petersburg, Russia; ²Ioffe Institute, St. Petersburg, Russia; ³Leibniz University Hannover, Hannover, Germany)

10.25 – 10.45

Numerical simulation of the photoacoustic effect in multilayer carbon nanostructures

Oleg Romanov, Igor Timoshchenko (Belarusian State University, Minsk, Belarus)

10.45 – 11.05

Switchable diffraction liquid crystal gratings for beam steering application

K.G. Kamiak, O.S. Kabanova, I.I. Rushnova, E.A. Melnikova, A.L. Tolstik (Belarusian State University, Minsk, Belarus)

11.05 – 11.25

Numerical simulation of convective motion of molten metal caused by laser radiation

S.G. Sharyna, I.A. Timoshchenko, O.G. Romanov (Belarusian State University, Minsk, Belarus)

11.25 – 11.45

Numerical Simulation of Electromagnetic Radiation Propagation in Quasi-Periodic Photonic Structures

Alexander Gapanovich, Oleg Romanov (Belarusian State University, Minsk, Belarus)

11.45 – 12.05

Numerical simulation of thermomechanical action of femtosecond laser pulses on metals

Sergey Lipski, Oleg Romanov Belarusian State University (Minsk, Belarus)

12.05 – 12.30

Numerical investigation on the evaporation of a droplet on a bifilic surface.....37

Alexander S. Fedotov, K. Bagdanchik, Y. Tsitavets (Belarusian State University, Minsk, Belarus)

Coffee Break, Final Discussions & Closing

12.30-13.00