



20th International Conference
Foundations & Advances in Nonlinear Science
28.09-2.10 2020
and
5nd International Symposium
Advances in Nonlinear Photonics
28.09-2.10 2020
Minsk, Belarus

FANS & ANPh Conferences Programme

Monday 28.09.2020

FANS & ANPh REGISTRATION **9.00 – 10.00**

Physics Department, room 326

OPENING **10.00 – 10.10**

Physics Department, room 330

Foreword by co-chairman prof. Alexey Tolstik

Plenary session **10.10 – 11.15**

Physics Department, room 330 (Chairman A. Tolstik)

10.10 – 10.50

Review of current research of nonlinear processes of radiation in vacuum electronic devices

S.Sytova (Institute for Nuclear Problems, Belarusian State University , Minsk, Belarus)

10.50 – 11.15

Features of hyperbolic and ENZ metasurfaces

S. Kurilkina, V. Belyi, N. Kazak_(B.I. Stepanov Institute of Physics, NAS of Belarus, Minsk, Belarus)

Coffee Break **11.15 – 11.30**

Physics Department, room 326

FANS session**11.30 – 13.10***Physics Department, room 330 (Chairman A. Pankov)***11.30 – 11.55****Exact solution of the Schroedinger equation for composition of Coulomb and oscillator potentials**Vladimir V. Kudryashov and Aleksandr V. Baran (Institute of Physics, NAS, Minsk, Belarus)**11.55 – 12.20****Simulation of laser melting of metals under pulsed excitation: comparative analysis of numerical schemes**Igor A Timoshchenko, Yoann Levy, Oleg Romanov (Belarusian State University, Minsk, Belarus)**12.20 – 12.45****Modeling the structure of air flows over a non-uniformly heated surface: comparative analysis of linearized meteorological and Boussinesq approximation**O.G. Romanov, M.Prokharenya (Belarusian State University, Minsk, Belarus)**12.45 – 13.10****On Mean of Solutions of SDE with Drift**Anatoly Zherelo (Belarusian State University, Minsk, Belarus)**Lunch Break****13.10 – 14.00****Plenary Session (online)****14.00 – 15.45**<https://eduphys.bsu.by/course/index.php?categoryid=75>*(Chairman Ihar Babushkin)***14.00 – 14.45****Modulation of light at a wavelength of 10.6 μm in metal-dielectric structures**F. Benabid (GPPMM group, XLIM Research Institut, CNRS-UMR 7252, Universite de Limoges, Limoges, France)**14.45 – 15.15****Heteronuclear Soliton Compounds**Oliver Melchert^{1,2}, Stephanie Willms^{1,2}, Uwe Morgner^{1,2,3}, Ihar Babushkin^{1,2}, and Ayhan Demircan^{1,2,3}

(1 Cluster of Excellence PhoenixD, Welfengarten 1, 30167, Hannover, Germany; 2 Institute of Quantum Optics, Leibniz Universität Hannover, Welfengarten 1, 30167, Hannover, Germany; 3 Hannover Centre for Optical Technologies, Nienburger Str. 17, 30167, Hannover, Germany)

15.15 – 15.45

Generation of subcycle THz and UV attosecond pulses via collective spontaneous emission from resonant medium

R.M. Arkhipov^{1,2,3}, M.V. Arkhipov^{1,2}, A.V. Pakhomov², I. Babushkin^{4,5}, A. Demircan^{4,5}, U. Morgner^{4,5}, N.N. Rosanov^{2,3} (1 St. Petersburg State University, St. Petersburg, Russia; 2 ITMO University St. Petersburg, Russia; 3 Ioffe Institute, St. Petersburg, Russia; 4 Institute of Quantum Optics, Leibniz University Hannover, Germany; 5 Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering—Innovation across Disciplines), Hannover, Germany)

Coffee Break

15.45 – 16.00

ANPh Session (online)

16.00 – 18.00

<https://eduphys.bsu.by/course/index.php?categoryid=75>
(Chairman Anton Gusakov)

16.00 – 16.30

Extreme THz pulse propagation through the doped Si

A.Savel'ev (Lomonosov MSU & JIHT RAS), O.Chefonov (JIHT RAS), A.Ovchinnikov (JIHT RAS), M.Agranat (JIHT RAS) (Friedrich Schiller University Jena, Jena, Germany)

16.30 – 17.00

Signatures of attosecond-scale electron dynamics in terahertz and higher order Brunel harmonics

Maria Richter¹, Marianna Lytova^{2,5}, Felipe Morales¹, Stefan Haessler³, Olga Smirnova^{1,4}, Michael Spanner^{2,5}, and Misha Ivanov^{1,6,7} (1. Max-Born-Institute, Max-Born Straße 2A, 12489 Berlin, Germany 2. Department of Physics, University of Ottawa, Ottawa K1N 6N5, Canada 3. Laboratoire d'Optique Appliquée, CNRS, École Polytechnique, ENSTA Paris, Institut Polytechnique de Paris, 181 Chemin de la Hunière et des Joncherettes, 91120 Palaiseau, France 4. Technische Universität Berlin, Straße des 17. Juni 135, 10623 Berlin, Germany 5. National Research Council of Canada, 100 Sussex Drive, Ottawa K1A 0R6, Canada 6. Department of Physics, Humboldt University, Newtonstraße 15, 12489 Berlin, Germany 7. Blackett Laboratory, Imperial College London, SW7 2AZ)

London, UK University of Hannover, Institute of Quantum Optics, Hannover, Germany)

17.00 – 17.30

Azopolymer-Based Diffractive Element for Optical Vortices Formation

E. Melnikova¹, I. Rushnova¹, O. Kabanova¹, D.V. Gorbach¹, S. Slussarenko¹, A. Tolstik¹, A. Meshalkin², C. Loshmansky², E. Achimova² (Paderborn University, Paderborn, Germany)

17.30 – 18.00

Generation of Terahertz Pulses in Semiconductor - Dielectric Nanoparticle Composite

O. Fedotova¹, A. Husakou², G. Rusetsky¹, O. Khasanov¹, A. Fedotov⁵, T. Smirnova¹, U. Sapaev⁴, I. Babushkin³ (¹Scientific-Practical Material Research Centre NAS Belarus, Minsk, Belarus; ²Max Born Institute, Berlin Germany; ³Leibniz University, Hannover, Germany; ⁴Tashkent State Technical University, Tashkent, Uzbekistan; ⁵Belarusian State University)

Tuesday 29.09.2020

Plenary Session

10.00 – 11.40

Physics Department, room 330 (Chairman Halina Grushevskaya)

10.00 – 10.40

Informational approach to quantum measurements in quantum mechanics and quantum chromodynamics

V.I. Kuvshinov (JIPNR-Sosny, Belarusian Academy of Science, Minsk, Belarus)

10.40 – 11.10

Improved constraints on the extra heavy gauge bosons decaying to pairs of bosons or leptons at the LHC with ATLAS

A.A. Pankov, I.A. Serenkova (ICTP Aff. Cntr. (Gomel/Trieste), INP BSU Minsk, Belarus; JINR (Dubna) Russia)

11.10 – 11.40

Improved constraints on the extra heavy gauge bosons decaying to pairs of bosons or leptons at the LHC with ATLAS

N.G. Krylova^{1,2}, V. Balan³, V.M. Red'kov⁴(¹Belarusian State University, Minsk, Belarus; ²Belarusian State Agrarian Technical University, Minsk, Belarus; ³University Politehnica of Bucharest, Bucharest, Romani; ⁴Institute of Physics of NAS of Belarus Minsk, Belarus)

Coffee Break **11.40 – 11.55**

FANS Session **11.55 – 13.25**

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

11.55 – 12.25

Conformal and projective invariance of a cosmological phase transition model on a contact statistical manifold with pseudo-Finsler metric

N.G.Krylova^{1,2}, H.V. Grushevskaya¹

(¹Belarusian State University, Minsk, Belarus; ²Belarusian State Agrarian Technical University, Minsk, Belarus)

12.25 – 12.55

The quark contributions to the nucleon spin from the neutrino experiments on the polarized targets

E.S.Timoshin, S.I.Timoshin(Gomel State Technical University, Gomel, Belarus)

12.55 – 13.25

Threshold resummation S-factor for a system of two relativistic spinor particles with arbitrary masses

Yu. D. Chernichenko, O. P. Solovtsova, and L. P. Kaptar (Gomel State Technical University, Gomel Belarus)

Lunch Break **13.25 – 14.30**

Plenary Session(online) **14.30 – 16.00**

<https://eduphys.bsu.by/course/index.php?categoryid=75>

(Chairman *Olga Fedotova*)

14.30 – 15.15

Topological laser solitons in one-, two-, and three-dimensional schemes

N.N. Rosanov, S.V. Fedorov, N.A. Veretenov (Ioffe Institute, St.-Petersburg, Russia)

15.15 – 16.00

Generation of short local-field pulses and third-harmonic pulses in a dielectric nanoparticle composite

A. Husakou², I. Babushkin³, O. Fedotova¹, R. Rysetsky¹, T. Smirnova¹, O. Khasanov¹, A. Fedotov⁵, U. Sapaev⁴ (¹Scientific-Practical Material Research Centre NAS Belarus, Minsk, Belarus; ²Max Born Institute, Berlin Germany; ³Leibniz University, Hannover, Germany; ⁴Tashkent State Technical University, Tashkent, Uzbekistan; ⁵Belarusian State University)

Coffee Break

16.00 – 16.15

ANPh session (online)

16.15 – 17.45

<https://eduphys.bsu.by/course/index.php?categoryid=75>

(Chairman George Krylov)

16.15 – 16.45

Tunable phase change material based metasurfaces: multiphysics simulations

Dmitry N. Chigrin (DWI Leibniz Institute for Interactive Materials, 52076 Aachen, Germany; I. Physikalisches Institut (1A), RWTH Aachen University, 52056 Aachen, Germany)

16.45 – 17.15

Femtosecond field-driven unidirectional electronic currents in asymmetric nanogaps.

Ihar Babushkin^(1,2,3), Liping Shi^(1,2), Anton Husakou⁽³⁾, Ayhan Demircan^(1,2,4), Misha Ivanov⁽³⁾, Uwe Morgner^(1,2,4), Milutin Kovacev^(1,2)

(1 Cluster of Excellence PhoenixD, Hannover, Germany; 2 Institute of Quantum Optics, Leibniz Universität Hannover, Germany; 3 Max Born Institute, Berlin, Germany.; 4 Hannover Centre for Optical Technologies, Hannover, Germany)

17.15 – 17.45

Laser-induced excitation of acoustic beams from spatially-profiled arrays of plasmonic nanoparticles

O.Romanov¹, I.Guenther¹, Ya.Shykov¹, G.Knyazev², V.Belotelov² (¹Belarusian State University, Minsk, Belarus, ²Lomonosov Moscow State University, Moscow, Russia)

Banquet

18.00

Rectorate building, Cafe

Wednesday 30.09.2020

Plenary Session **10.00 – 11.30**

Physics Department, room 330 (Chairman Oleg Romanov)

10.00 – 10.30

On the contribution of 4-bubble diagrams to the lepton anomaly

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

10.30 – 11.00

EEG patterns of human and the presence of depression

Alevtina Sidorenko, N. A. Saladukha (Belarusian State University, Minsk, Belarus)

11.00 – 11.30

Confinement of graphene charge carriers induced by high-frequency electromagnetic irradiation in monolayers of multiwalled carbon nanotubes

H.V. Krylova, I.V. Lipnevich (Belarusian State University, Minsk, Belarus)

Coffee Break **11.30 – 11.45**

FANS Session **11.45 – 13.15**

Physics Department, room 330 (Chairman Alexey Tolstik)

11.45 – 12.15

Spatially distributed model of Yb-Er laser with plane parallel resonator and end pump.

Lubou Krylova (Belarusian State University, Minsk, Belarus)

12.15 – 12.35

Form Factor for a System of Two Fermions of Equal Masses in the Relativistic Quasipotential Approach

Yu. D. Chernichenko and V. V. Kondratjuk (Gomel State Technical University, Gomel, Belarus)

12.35 – 12.55

On the Trivalent Graph Colouring

Dmitry Serow (State Institute of Economy Finance Law and Technology, Gatchina, Russia)

12.55 – 13.15

Possibilities of GEANT4 toolkit extension for simulations of nanostructural systems

George Krylov (Belarusian State University, Minsk, Belarus)

Lunch Break

13.15 – 14.15

Plenary session (online)

14.15 – 17.00

<https://eduphys.bsu.by/course/index.php?categoryid=75>

(Chairman Dmitry Chigrin)

14.15 – 15.00

Ultrashort light fields for ultrabroadband terahertz science

Luc Bergé (Commissariat à l'Énergie Atomique et aux Énergies Alternatives CEA, DAM, DIF – 91297 Arpajon - France State Technical University of Gomel, Gomel, Belarus)

15.00 – 15.30

Gas Plasma based THz sources

Stefan Skupin (Institut Lumiere Matiere, Universite Lyon 1 - CNRS, Universite de Lyon, Villeurbanne, France)

15.30 – 16.00

Cage solitons

Gunter Steinmeyer (Max-Born-Institut, Berlin, Germany)

Coffee Break

16.00 – 16.15

ANPh session (online)

16.15 – 17.45

<https://eduphys.bsu.by/course/index.php?categoryid=75>

(Chairman Stefan Skupin)

16.15 – 16.45

Nonlinear localized structures in optical systems supporting bound states in the continuum

Daria A. Dolinina, Alexey V. Yulin
(ITMO University, St. Petersburg, Russia)

16.45 – 17.15

Reorientation of Combined Cells with Doped Nematic due to the Photovoltaic Effect

S. Slussarenko¹, E. Melnikova¹, A. Tolstik¹, L. Lucchetti²
(1Belarusian State University, 4 Nezavisimosti ave., Minsk, Belarus
2Università Politecnica delle Marche, Via Brecce Blanche, Ancona, Italy)

17.15 – 17.45

Approximate methods for studying second harmonic generation of ultrashort laser pulses (up to 5 fs) in nonlinear photonic crystals

Z. J. Ruziev, I.O. Sobirov, K. A. Korabaev, U. K. Sapaev (Tashkent State Technical University, Tashkent, Uzbekistan)

Thursday 01.10.2020

Plenary Session(online)

10.00 – 11.50

<https://eduphys.bsu.by/course/index.php?categoryid=75>
(Chairman Ihar Babushkin)

10.00 – 10.40

Lévy-like movement patterns of metastatic cancer cells

Konstantin V. Tretiakov (Institute of Molecular Physics, Polish Academy of Sciences, Poznań, Poland)

10.40 – 11.20

The effect of symmetry breaking on reversible systems with mixed dynamics

Viktorija Tamulienė (Laser Research Center, Vilnius University, Saulėtekio 10, Vilnius LT-10223, Lithuania)

11.20 – 11.50

Controlled ultrafast energy deposition and high harmonic generation in crystalline silicon irradiated by near-infrared femtosecond laser pulse

Tzveta Apostolova (1- Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Tsarigradsko chausse 72, 1784 Sofia, Bulgaria, 2- Institute for Advanced Physical Studies, New Bulgarian University, 1618 Sofia, Bulgaria)

Coffee Break **11.50 – 12.05**

Plenary Session(online) **12.05 – 13.25**

<https://eduphys.bsu.by/course/index.php?categoryid=75>

(Chairman Oleg Romanov)

12.05 – 12.35

Giant third-order nonlinearity of liquids at terahertz frequencies is determined by molecular second-order response

Anton N. Tsyppkin¹, Maria O. Zhukova¹, Maksim V. Melnik¹, Saumya Choudhary², Irina O. Vorontsova¹, Maksim S. Kulya¹, Sergey E. Putilin¹, Sergei A. Kozlov¹, Robert W. Boyd³ (1Laboratory of Femtosecond Optics and Femtotechnology, ITMO University, Saint-Petersburg, Russia; 2The Institute of Optics, University of Rochester, Rochester, NY, USA; 3Department of Physics, University of Ottawa, Ottawa, Ontario, Canada)

12.15 – 12.35

Resonant light scattering by silicon nanoparticles for dielectric photonics

Andrey Evlyukhin (Leibniz University Hannover, Germany)

12.35 – 12.55

η - η ' System in a Covariant Constituent Quark Model with Infrared Con nement.

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

12.55 – 13.25

Self-induced transparency mode-locking: theoretical analysis, experimental observation and single-cycle pulse generation

R.M. Arkhipov^{1,2,3}, M.V. Arkhipov^{1,2}, A.A. Shimko¹, I. Babushkin^{4,5}, N.N. Rosanov^{2,3}(1 St. Petersburg State University, St. Petersburg, Russia; 2 ITMO University St. Petersburg, Russia; 3 Ioffe Institute, St. Petersburg, Russia; 4Institute of Quantum Optics, Leibniz University Hannover, Germany; 5 Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering—Innovation across Disciplines), Hannover, Germany))

Meetings Closure(online)

13.25-13.30

<https://eduphys.bsu.by/course/index.php?categoryid=75>

(Chairman Leonid Tolstik)