



19th International Conference  
*Foundations & Advances in Nonlinear Science*  
24.09-27.09 2018  
and  
4<sup>nd</sup> International Symposium  
*Advances in Nonlinear Photonics*  
24.09-27.09 2018  
Minsk, Belarus

## FANS & ANPh Conferences Programme

**Monday 24.09.2018**

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**FANS & ANPh REGISTRATION** **8.00 – 10.00**

*Rectorate building, Conference hall*

**OPENING** **10.00 – 10.15**

*Rectorate building, Conference hall*

**Foreword by vice-rector academician Oleg Ivashkevich**

**Plenary session** **10.15 – 11.45**

*Rectorate building, Conference hall (Chairman A. Tolstik)*

**10.15 – 11.00**

**Improved constraints on the  $Z-Z'$  mixing from diboson production data at the LHC at  $\sqrt{s}=13$  TeV and predictions for Run II.**

A.A. Pankov, V.A. Bednyakov, I.D. Bobovnikov (Tech Univ of Gomel & INP, BSU, Minsk & JINR, Dubna)

**11.00 – 11.45**

**Virtual laboratory practicum on modeling of atmospheric physics phenomena**

O.G. Romanov, G.G. Krylov, A.N. Kozlovski, L.B. Eliseeva, I.A. Timofeeva, A.S. Fedotov, S.V. Bahanovich, A.V. Zherelo, I.A. Belyavtsev (Belarusian State University, Minsk, Belarus)

**Coffee Break** **11.45 – 12.05**

*Physics Department, room 326*

**Plenary session** **12.05 – 13.30**

*Physics Department, room 330 (Chairman A. Pankov)*

**12.05 – 12.50**

**Parametric Amplification of Few-cycle Optical Pulses**

Uwe Morgner (Leibniz University Hannover, Institute of Quantum Optics, Hannover, Germany)

**12.50 – 13.30**

**Structural stability and KCC geometric objects for the real SODE of the spin 1 particle in the Coulomb field**

Viktor Red'kov, Vladimir Balan, Elena Ovsiyuk (B.I. Stepanov Institute of Physics, NAS of Belarus, Minsk, Belarus; University Politehnica of Bucharest, Romania;)

**Lunch Break** **13.30 – 15.00**

**Plenary Session** **15.00 – 16.45**

*Physics Department, room 330 (Chairman G.G. Krylov)*

**15.00 – 15.40**

**Modulation of light at a wavelength of 10.6  $\mu\text{m}$  in metal-dielectric structures**

G.A. Knyazev, I.M. Sopko (Lomonosov Moscow State University, Moscow, Russia)

**15.40 – 16.20**

**Temperature dependence of quantum correlations in quasi 1D macromolecular chains**

A.V. Chizhov, D. Cevizovic, Z. Ivic, S. Galovic (Joint Institute for Nuclear Research, Dubna, Russia)

**16.20 – 16.45**

**Hyperchaos after Neimark-Sacker bifurcation in different maps**

E.S. Popova, N.V. Stankevich (Saratov Division of Institute of Radio-Engineering and Electronics of RAS, Russia)

**Coffee Break****16.45 – 17.05***Physics Department, room 326***ANPh Session****17.05 – 18.30***Physics Department, room 330 (Chairman O.G. Romanov)***17.00 – 17.30****Generation of Short Deep-UV Pulses in Transparent Solids with a Noncollinear Beam Geometry**

J. Reislöhner, C. Leithold, A. N. Pfeiffer (Friedrich Schiller University Jena, Jena, Germany)

**17.30 – 17.55****Signatures of attosecond-scale electron dynamics in terahertz and higher order Brunel harmonics**

Ihar Babushkin (University of Hannover, Institute of Quantum Optics, Hannover, Germany)

**17.55 – 18.20****Linear and nonlinear Bloch oscillations in multidimensional settings.**

Rodislav Driben (Paderborn University, Paderborn, Germany)

**18.20 – 18.45****Optical transients in nanocomposites and their characterization**

O. Khasanov<sup>1</sup>, O. Fedotova<sup>1</sup>, T. Smirnova<sup>2</sup>, G. Rusetsky<sup>1</sup>, V. Gayvoronsky<sup>3</sup>, S. Pokutnyi<sup>4</sup> ( <sup>1</sup>Scientific-Practical Material Research Centre NAS Belarus, Minsk, Belarus; <sup>2</sup>International Sakharov Environmental Institute of BSU, Minsk, Belarus; <sup>3</sup>Physics Institute NAS Ukraine, Kyiv, Ukraine; <sup>4</sup>Chuiko Institute of Surface Chemistry, NAS Ukraine, Kyiv, Ukraine)

**18.45 – 19.10****Polarization-Phase Dynamics in Lasers**

Larissa Svirina (Belarussian National Technical University, Minsk, Belarus)

**19.10 – 19.30****Study of the indicative surfaces of the diffractive efficiencies of mixed holograms in BTO crystal of different thickness and cuts**

V. V. Shepelevich<sup>1</sup>, A. V. Makarevich<sup>1</sup>, M. A. Amanova<sup>1</sup> and S. M. Shandarov<sup>2</sup> (<sup>1</sup>I.P. Shamyakin Mozyr State Pedagogical University, Mozyr, Belarus; <sup>2</sup>Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia)

**19.30 – 20.00**

**Newtonian soliton collisions and trapping induced molecule states**

O. Melchert<sup>1</sup>, S. Willms<sup>2</sup>, I. Babushkin<sup>2</sup>, B. Roth<sup>1</sup>, U. Morgner<sup>2</sup>, and A. Demircan<sup>1,2</sup> (<sup>1</sup> Hannover Centre for Optical Technologies, Hannover, Germany; <sup>2</sup> Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany)

**Tuesday 25.09.2018**

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**Plenary Session**

**10.00 – 11.30**

*Physics Department, room 330 (Chairman Ihor Babushkin)*

**10.00 – 10.45**

**Attosecond recorder of the polarization state of light**

Á. Jiménez-Galán, G. Dixit, S. Patchkovskii, O. Smirnova, F. Morales, M. Ivanov (Max Born Institut Berlin, Berlin, Germany)

**10.45 – 11.30**

**Modeling of complex nonlinear dynamics of radiation of high-current particle beams in spatially-periodic structures**

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

**Coffee Break**

**11.30 – 11.50**

**Plenary Session**

**11.50 – 13.35**

*Physics Department, room 330 (Chairman Svetlana Sytova )*

**11.50 – 12.35**

**Optical lasing during laser filamentation in the Nitrogen molecule: ro-vibrational inversion**

Felipe Morales<sup>1</sup>, Maria Richter<sup>1,2</sup>, Olga Smirnova<sup>1,3</sup>, Misha Ivanov<sup>1,4,5</sup> (<sup>1</sup>Max-Born-Institut, Berlin, Germany; <sup>2</sup>Departamento de Química, Universidad Autónoma de Madrid, Spain; <sup>3</sup>Technische Universität Berlin, Germany; <sup>4</sup>Blackett Laboratory, Imperial College London, United Kingdom; <sup>5</sup>Department of Physics, Humboldt University, Berlin, Germany )

**12.35 – 13.05**

**Trapping of radiation within a solitary well**

O. Melchert<sup>1</sup>, I. Babushkin<sup>2</sup>, B. Roth<sup>1</sup>, U. Morgner<sup>2</sup>, and A. Demircan<sup>1,2</sup> (<sup>1</sup> Hannover Centre for Optical Technologies, Hannover, Germany; <sup>2</sup> Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany)

**13.05 – 13.35**

**Lepton flavor violation in Z boson decays**

O.M.Boyarkin, G.G.Boyarkina, D.S.Vasileuskaya (Belarusian State University, International State Ecological University after A.D. Sakharov, Minsk, Belarus)

**Lunch Break**

**13.35 – 15.00**

**Plenary Session**

**15.00 – 16.45**

*Physics Department, room 330 (Chairman Alexey Savin )*

**15.00 – 15.30**

**Optoacoustical transducer based on plasmonic nanoparticles**

V.I. Belotelov, A.N. Kalish, G.A. Knyazev, E.T.T. Nguen, O.G. Romanov, A.L. Tolstik (Lomonosov Moscow State University, Moscow, Russia; Belarusian State University, Minsk, Belarus)

**15.30 – 16.00**

**Modification of terahertz radiation generation by laser-preformed air plasma**

V. Vaičaitis, Ž. Svirskas, D. Buožius, M. Ivanov, U. Morgner, I. Babushkin (Laser Research Center, Vilnius University; Institute of Quantum Optics, Leibniz University of Hannover)

**16.00 – 16.30**

**Dynamics of coupled generators of quasiperiodic oscillations: different types of synchronization and chaos formation**

N.V. Stankevich, A.P. Kuznetsov (Yuri Gagarin State Technical University of Saratov, Saratov, Russia)

**Coffee Break**

**16.30 – 16.50**

*Physics Department, room 326*

**FANS session****16.50 – 18.20***Physics Department, room 330 (Chairman George Krylov)***16.50 – 17.15****Radiation resistivity of carbon nanotube bundles decorated by organo-metallic compound**H. V. Krylova, E. A. Awdanina, I. V. Lipnevich (Belarusian State University, Minsk, Belarus)**17.15 – 17.40****Vortex beam propagation and formation of vortex light-guide in photopolymers**O.G.Romanov (Belarusian State University, Minsk, Belarus)**17.40 – 18.15****Thermomechanical action of laser pulses on azimuthally inhomogeneous absorbing layer**O.G. Romanov, A.N. Kozlovski (Belarusian State University, Minsk, Belarus)**18.15 – 18.40****Quasi-harmonic approximation in the case of potential wells of a finite depth**Aliaksandr Baran (B.I. Stepanov Institute of Physics, NAS of Belarus, Minsk, Belarus )**18.40 – 19.05****Numeric Topological Invariants for Birkhoff Curves**Dmitry W. Serow (Peter the Great St. Petersburg Polytechnic University, Saint Petersburg (Hero City Leningrad), Russia )**19.05 – 19.30****On an approximation for functionals on solutions of SDE in Stratonovich sense**Alexander D. Egorov, Anatoly Zherelo (Institute of Mathematics, NAS of Belarus, Belarusian State University, Minsk, Belarus)**Wednesday 26.09.2018**

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**Plenary Session****10.00 – 11.30***Physics Department, room 330 (Chairman G.A. Knyazev)*

**10.00 – 10.50**

**Amplification of intense light fields by nearly free electrons**

Nicolas Bert<sup>1</sup>, Sylvain Hermelin<sup>1</sup>, Jeome Kasparian<sup>1</sup>, Maria Richter<sup>2,4</sup>, Timm Bredtman<sup>2</sup>, Olga Smirnova<sup>2</sup>, Jean-Pierre Wolf<sup>1</sup> and Misha Ivanov<sup>2</sup> (<sup>1</sup>GAP - Biophotonics, Universite de Geneve, Geneve, Switzerland; <sup>2</sup>Max-Born-Institut, Berlin, Germany; <sup>3</sup>Institut fur Experimentalphysik, Freie Universitat Berlin, Berlin, Germany; <sup>4</sup>Departamento de Quimica, Universidad Autonoma de Madrid, Madrid, Spain)

**10.50 – 11.35**

**Diffraction methods for investigation of periodically poled domain structures in ferroelectric lithium niobate crystals**

S.M. Shandarov<sup>1</sup>, E.N. Savchenkov<sup>1</sup>, M.V. Borodin<sup>1</sup>, A.E. Mandel<sup>1</sup>, S.V. Smirnov<sup>1</sup>, A.R. Atmatkhanov<sup>2</sup>, V.Ya. Shur<sup>2</sup> (<sup>1</sup>Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia; <sup>2</sup>Ural Federal University, Ekaterinburg, Russia)

**Coffee Break**

**11.35 – 11.50**

**Plenary Session**

**11.50 – 13.20**

*Physics Department, room 330 (Chairman Konstantin Tretiakov)*

**11.50 – 12.20**

**Graphene-based PT-symmetric structures,**

Yu. V. Bludov, M.I. Vasilevskiy, N.M.R. Peres, (Universidade do Minho, Centro de Física e Departamento de Física, Braga, Portugal)

**12.20 – 12.50**

**Inverse Cherenkov effect and phase locking of solitons to dispersive waves in passive and active systems**

A. Yulin (ITMO University, St. Petersburg, Russia)

**12.50 – 13.20**

**Complex entangled photon states on a chip**

Michael Kues<sup>1,2,+</sup>, Christian Reimer<sup>1</sup>, Piotr Roztocky<sup>1</sup>, Luis Romero Cortés<sup>1</sup>, Stefania Sciara<sup>1,3</sup>, Benjamin Wetze<sup>1,1,4</sup>, Yanbing Zhang<sup>1</sup>, Alfonso Cino<sup>3</sup>, Sai T. Chu<sup>5</sup>, Brent E. Little<sup>6</sup>, David J. Moss<sup>7</sup>, Lucia Caspani<sup>8</sup>, José Azaña<sup>1</sup> and Roberto

Morandotti<sup>1,9,10,+</sup> ( <sup>1</sup>INRS-EMT, 1650 Boulevard Lionel-Boulet, Varennes, Québec, J3X 1S2, Canada. <sup>2</sup>School of Engineering, University of Glasgow, Rankine Building, Oakfield Avenue, Glasgow G12 8LT, UK. <sup>3</sup>University of Palermo, Department of Energy, Information Engineering and Mathematical Models, Palermo, Italy. <sup>4</sup>School of Mathematical and Physical Sciences, University of Sussex, Falmer, Brighton BN1 9RH, UK. <sup>5</sup>Department of Physics and Material Science, City University of Hong Kong, Tat Chee Avenue, Hong Kong, China. <sup>6</sup>Xi'an Institute of Optics and Precision Mechanics of CAS, Xi'an, China. <sup>7</sup>Centre for Micro Photonics, Swinburne University of Technology, Hawthorn, VIC, 3122 Australia. <sup>8</sup>Institute of Photonics, Department of Physics, University of Strathclyde, Glasgow G4 0NW, UK. <sup>9</sup>National Research University of Information Technologies, Mechanics and Optics, St. Petersburg, Russia. <sup>10</sup>Institute of Fundamental and Frontier Sciences, University of Electr. Science and Technology of China, Chengdu 610054, China.)

## **Lunch Break**

**13.20 – 15.00**

## **Plenary session**

**15.00 – 17.00**

*Physics Department, room 330 (Chairman Viktor Red'kov)*

**15.00 – 15.30**

### **Electromagnetic and gravitational interactions of a Proca particle**

Alexander Silenko (Belarusian State University, Institute for Nuclear Problems, Minsk, Belarus)

**15.25 – 15.50**

### **Design of reconfigurable meta-surfaces: modelling done right**

Dmitry Chigrin (DWI - Leibniz Institute for Interactive Materials, Aachen, Germany; Institute of Physics (1A), RWTH Aachen University, Aachen, Germany)

**15.50 – 16.15**

### **Electroweak Interactions of Kaons**

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

**16.15 – 16.35**

### **On P-noninvariant wave equation for spin 1/2 particle in presence of external fields, models for anapole moment.**

V.V. Kisel, V.A. Pletyukhov, E.M. Ovsiyuk, V.M. Red'kov (B.I. Stepanov Institute of Physics, NAS of Belarus, Minsk, Belarus)



**Coffee Break** **16.35 – 16.50**

*Physics Department, room 326*

**FANS session** **16.50 – 16.40**

*Physics Department, room 321 (Chairman Halina Grushevskaya)*

**16.50 – 17.10**

**Interactions of Light Scalar Mesons**

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

**17.10 – 17.30**

**Physics of the antineutrino detector**

V.V. Gilewsky, I.S. Satsunkevich, V.M. Redkov, O.M. Boyarkin (JIPNR-Sosny, Minsk, Belarus)

**17.30 – 17.50**

**Monte-Carlo simulation of phase transition driven by fluctuations in nuclear matter**

L.F. Babichev, Yu.A. Rusak (JIPNR-Sosny, Minsk, Belarus)

**17.50 – 18.10**

**Analytically solved examples and high-precision numerical estimates of Mellin-Barnes integrals**

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

**Opera & Ballet Theater** **19.00 – 21.00**

**Thursday 27.09.2018**

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**Plenary Session** **10.00 – 11.30**

*Physics Department, room 330 (Chairman Stanislav Shandarov)*

**10.00 – 10.45**

**Influence of strong geometrical confinements on the thermal conductivity of argon — a molecular dynamics study**

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

**10.45 – 11.30**

**The effect of symmetry breaking on reversible systems with mixed dynamics**

Alexey Savin (Saratov State University, Saratov, Russia)

**Coffee Break**

**11.30 – 11.45**

*Physics Department, room 326*

**Plenary Session**

**11.45 – 13.15**

*Physics Department, room 330 (Chairman Viktor Red'kov)*

**11.45 – 12.15**

**Quantum system interaction with environment in QCD**

Viatcheslav Kuvshinov (JIPNR-Sosny, Minsk, Belarus)

**12.15 – 12.45**

**Emotin state of an operator influenced by electromagnetic noise radiation**

Alevtina Sidorenko (Belarusian State University, Minsk, Belarus)

**12.45 – 13.10**

**Optical and electrochemical properties of cNT-DNA complexes loaded by quinones**

I.I. Zholnerevich, N.G. Krylova (Belarusian State University, Minsk, Belarus)

**13.10 – 13.35**

**Non-Abelian Zak phase in quasi-relativistic model of graphene**

Halina Grushevskaya, George Krylov (Belarusian State University, Minsk, Belarus)

**Lunch Break**

**13.35 – 15.00**

**Plenary session**

**15.00 – 16.00**

*Physics Department, room 330 (Chairman Alexey Yulin )*

**15.00 – 15.30**

**Classical and quantum-mechanical description of dynamics of twisted electrons in electromagnetic fields**

Alexander J. Silenko, Pengming Zhang, and Liping Zou\_(Belarusian State University, Institute for Nuclear Problems, Minsk, Belarus)

**15.30 – 16.00**

**Relativistic spin 1 particle in presence of Coulomb field, quantum states with minimal angular momentum  $j = 0$  in Lobachevsky and Riemann space models**

Elena Ovsyuk (Mozyr State Pedagogical University named after I.P. Shamyakin, Mozyr, Belarus)

**Coffee Break**

**16.00 – 16.20**

*Physics Department, room 326*

**ANPh session**

**16.20 – 16.00**

*Physics Department, room 321 (Chairman Oliver Melchert)*

**16.20 – 16.50**

**Plasma-based generation of intense sub-cycle pulses**

I. Thiele, E. Siminos, T. Fülöp (Chalmers University of Technology, Göteborg, Sweden)

**16.50 – 17.25**

**Dynamic Diffraction Optical Elements Based On Liquid-Crystal Periodic Structures**

V.S.Kabanava, I.I.Rushnova, E.A.Melnikova, A.L.Tolstik, R.Heinzmann (Belarusian State University, Minsk, Belarus)

**16.50 – 17.25**

**Experimental study of spatial multistability and local properties of laser intensity in a multimode VCSEL**

V. N. Chizhevsky and S. A. Kovalenko (B.I. Stepanov Institute of Physics, Minsk, Belarus)

**17.25 – 17.50**

**Cavity dumping by the second harmonic generation in the mode-locked Nd:YAG laser**

Roza Navitskaya, Ihar Stashkevitch (Belarusian State University, Minsk, Belarus)

**Final Discussion & Closing** **18.00**

*Physics Department, room 321 (Chairman: A. Tolstik)*

**Banquet** **18.30**

*Rectorate building, Cafel*

**Friday 28.09.2018**

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**Excursion to "Dudutki" Ethnological Museum** **09.00 – 16.00**