CONFERENCE PROGRAM

ICONO/LAT 2016

International Conference on Coherent and Nonlinear Optics (ICONO)
Conference on Lasers, Applications, and Technologies (LAT)

National Cultural Center, Oktyabrskaya str. 5
Minsk, Belarus
September 26–30, 2016

Organized by

National Academy of Sciences, Belarus (NASB)
Russian Academy of Sciences (RAS)
Lomonosov Moscow State University (MSU)

Co-Organized by

B.I. Stepanov Institute of Physics,
National Academy of Sciences of Belarus
A. M. Prokhorov General Physics Institute,
Russian Academy of Sciences
International Laser Center, M. V. Lomonosov
Moscow State University

Sponsored by

National Academy of Sciences, Belarus (NASB),
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PROGRAM HIGHLIGHTS

WELCOME TO ICONO/LAT 2016!

The International Conference on Coherent and Nonlinear Optics (ICONO 2016) and the Conference on Lasers, Applications, and Technologies (LAT 2016) will be held concurrently, September 26–30, 2016 at the National Cultural Center in Minsk, Belarus.

The ICONO conference has a rich four-decade tradition as the principal conference in Russia and the Former Soviet Union in quantum electronics, basic research in lasers, nonlinear and quantum optics, quantum information and quantum computing, fundamental laser metrology, physics of high-power laser interactions with matter, and physics of nanostructures. The LAT conference, started just in 2002, complements the ICONO conference in a wide range of laser technologies and applications including laser device development, processing of advanced materials, optical information technologies, biomedicine and ecology applications.

TECHNICAL PROGRAM OVERVIEW

Abstracts of the papers to be presented at ICONO/LAT 2016 appear in this *Conference Program*. The presentation of the majority of the papers requires 5 parallel sessions during the five-days conference. All plenary, oral, and poster sessions will take place at the National Cultural Center in Minsk, Belarus. Together, ICONO and LAT have a total of about 550 papers. Special symposia will be organized in the frame of the ICONO/LAT 2016 targeting at emerging fields by putting emphasis on fast developing, well defined topics (see below).

LANGUAGE

English will be the official language of the conference, which will be used for all printed materials, presentations, and discussions.

JOINT PLENARY SESSIONS

Two joint plenary sessions will take place in the Big Hall at 13:30–16:30 on September 26 and at 14:30–16:30 on September 28. This year's plenary sessions will feature four distinguished talks listed below.

September 26 ● 13:10–14:00 ● PLENARY

Tribute to Rem Khokhlov, V.A. Makarov, *Lomonosov Moscow State University, Russia.*

With this talk we pay tribute to Rem Khokhlov, a world-known soviet scientist and a pioneer of Laser Physics, Nonlinear Optics, and Nonlinear Acoustics whose 90th jubilee we do celebrate this year. The range of scientific interests of Rem Khokhlov was very wide. To him belong fundamental results in nonlinear theory of oscillations, in quantum electronics, in optics and in acoustics. World fame was brought to Rem Khokhlov by his works on the theory of nonlinear wave processes, nonlinear optics, tunable lasers, and interaction of intense radiation with matter.

Rem Khokhlov was born on 15 July, 1926 in the city of Livna of the Orlov district in the USSR. In 1950 he graduated from Lomonosov Moscow State University. In 1952 he received his PhD degree with the same university becoming then a professor and finally rector of Lomonosov Moscow State University. For his outstanding scientific services Rem Khokhlov was elected in 1966 a corresponding member of the Academy of Sciences of the USSR and in 1974 a full member of the Academy of Sciences of the USSR. He was awarded the honorary doctorate by a number of foreign universities.

Another page of the scientific biography of Rem Khokhlov is associated with the organization and coordination of work on nonlinear optics in the USSR and, specifically, with launching the series of conferences on the topic of "Coherent and nonlinear optics," which has been grown up to one of the major international conferences in this area around the world, ICONO.

Rem Khokhlov was a many-sided and harmonious man. He had a deep interest in literature, art, and with great sensitivity detected new directions in these fields. Rem knew well and understood sport, and had an undying love for mountains. People were attracted to Rem by his remarkable human qualities, his real kindness, his sincere desire to hear people out and to help them. In science he was remark-ably objective in evaluating the work of others; he was quite free of bias. We and young generation of scientists keep memories of Rem Khokhlov, a remarkable scientist and human being who will forever remain in our hearts.

September 26 ● 14:00–15:00 ● PLENARY

Ultrafast nonlinear optics in the mid-infrared: Here be dragons, A.M. Zheltikov, *Lomonosov Moscow State Univ., Russia; Kurchatov Inst., Russia; Russian Quantum Ctr, Russia; Texas A&M Univ., USA.*

Motivated and driven by numerous applications and long-standing challenges in strong-field physics, molecular spectroscopy, semiconductor electronics, and standoff detection, ultrafast optical science is rapidly expanding toward longer wavelengths. Recent experiments reveal unique properties of filaments induced by ultrashort laser pulses in the mid-infrared, where the generation of powerful supercontinuum radiation is accompanied by unusual scenarios of optical harmonic generation, giving rise to remarkably broad radiation spectra, stretching from the visible to the mid-infrared. Generation of few- and even single-cycle mid-infrared field waveforms with peak powers ranging from a few megawatts to hundreds of gigawatts has been demonstrated within a broad range of central wavelengths. Below-the-bandgap high-order harmonics generated by ultrashort mid-infrared laser pulses are shown to be ideally suited to probe the nonlinearities of electron bands, enabling an all-optical mapping of the electron band structure in bulk solids. This lecture will provide an overview of exciting new physics behind the recent achievements in this rapidly growing area of ultrafast optical science.

Aleksei Zheltikov is a professor at M.V. Lomonosov Moscow State University since 2000, professor at Texas A&M University since 2010, the head of Laboratory of Neurophotonics at Kurchatov Institute Russian Research Center since 2010, and the head of Advanced Photonics international laboratory at the Russian Quantum Center since 2012. He is a winner of the Russian Federation

State Prize for young researchers (1997), Lamb Award for achievements in quantum electronics (2010), Shuvalov Prize for research at Moscow State University (2001), and Kurchatov Prize for achievements in neurophotonics (2014).

September 26 ● 15:00–16:00 ● PLENARY

New frontiers in quantum optomechanics, M. Aspelmeyer, *University of Vienna, Austria.*

The quantum optical control of solid-state mechanical devices, quantum optomechanics, has emerged as a new frontier of light-matter interactions. Devices currently under investigation cover a mass range of more than 15 orders of magnitude - from nanomechanical waveguides of some picograms to macroscopic, kilogram-weight mirrors of gravitational wave detectors. This development has been enabled by the insight that quantum optics provides a powerful toolbox to generate, manipulate and detect quantum states of mechanical motion, in particular by coupling the mechanics to an optical or microwave cavity field. Originally, such cavity optomechanical systems have been studied from the early 1970s on in the context of gravitational wave antennas beginning with the pioneering works by Braginsky. Advancements in micro-fabrication and micro-cavities, however, have resulted in the development of a completely new generation of nano- and micro-optomechanical devices. Today, 10 years after the first demonstrations of laser cooling of micromechanical resonators, the quantum regime of nano- and micromechanical motion is firmly established. Recent experimental achievements include the generation of genuinely non-classical states of micromechanical motion such as quantum squeezing and entanglement. This level of control over solid-state mechanical degrees of freedom is now also being utilized in diverse application domains ranging from classical sensing, to low-noise optical coatings for precision interferometry, and also to photon-phonon quantum interfaces.

From the fundamental physics point of view, one of the fascinating prospects of quantum optomechanics is to coherently control the motional degree of freedom of a massive object in an unprecedented parameter regime of large mass and long coherence time, hence opening up a new avenue for macroscopic quantum experiments. The availability of quantum superposition states involving increasingly massive objects could enable a completely new class of experiments, in which the source mass character of the quantum system starts to play a role. This addresses directly one of the outstanding questions at the interface between quantum physics and gravity, namely "how does a quantum system gravitate?"

Marcus Aspelmeyer is Professor of Physics at the University of Vienna, Austria. His research combines the development of new quantum technologies with fundamental quantum experiments. Aspelmeyer is regarded as one of the pioneers of the field of quantum optomechanics. He is a founding member and present Speaker of the Vienna Center for Quantum Science and Technology (VCQ), and Speaker of the Vienna graduate programme "Complex Quantum Systems" (CoQuS). In 2012 he has co-forunded the high-tech company „Crystalline Mirror Solutions", which provides novel optics for laser precision measurements. For his contributions to quantum science and technological innovation he has received several prizes, among them the Berthold Leibinger Innovation Prize, the Ignaz Lieben Prize of the Austrian Academy of Sciences, the Bessel Award of the Alexander von Humboldt Foundation and the Fresnel Prize of the European Physical Society. He is a Fellow of the American Physical Society, a Member of the Young Academy of the Austrian Academy of Sciences and a Member of the European Academy of Sciences and Arts.

September 28 ● 14:30–15:10 ● PLENARY

Metamaterials in optical spectral region: technologies, properties and perspectives of application, Vladimir Belyi, *B.I. Stepanov Institute of Physics, Belarus*

The past ten years have seen the emergence of metamaterials in optical spectral region characterized by extraordinary properties. Their ability to manipulate parameters of light radiation in new ways has led to many novel applications. Examples include super resolution imaging, negative refraction, optical cloaking, enhance nonlinear interaction and others.

The state of affairs have been analyzed in theory of propagation and transformation of light fields (amplitude, polarization, directivity) in optical metamaterials having different structures and technologies of fabrication and possessing the potential for broadband manipulation of the density of photonic states and subwavelength light confinement. A special attention is devoted to the appearance of a number of novel effects in optical metamaterials with extreme parameters (particularly, in metamaterials with close to zero dielectric permittivity (ENZ-materials)): tunneling through super narrow channel, formation of narrowband light beams, amplifying of optical nonlinearities. Also there have been analyzed the properties of a new class of metamaterials with extremely high optical anisotropy, which are perspective, for example, for creation of plasmonic, deep subwavelength bulk waveguides.

There have been investigated the peculiarities of excitation and properties of new types of plasmon-polaritons, so called Bessel, single and multiplasmons possessing the property of quasinon-diffraction. Particularly, singular radiative plasmon-polariton in ENZ optical materials has been predicted.

On the basis of the fabricated hyperbolic metamaterials there have been proposed and realized new configurations of flat lenses (so called superlenses) of near and far field in a spectral region from ultraviolet up to infrared radiation. The developed superlenses of near field provide spatial resolution below the diffraction limit and allow achieving high local amplification of intensity (for example, at the wavelength of $\lambda = 365$ nm the resolution is $\lambda/5$ and the amplification is 30). There has been determined and proved experimentally the light focusing criterion, namely, the presence of negative curvature of flat lens phase characteristic. For the first time it has been established that for the incident on a superlens light filed with radial polarization the regime of focusing is realized and with the azimuthal polarization – regime of channeling, i.e. the formation of narrow nondivergent light beam. New ways have been proposed of application of near-field lens for formation of two-scale light field, for resonance-amplified nanolithography and so on.

The methods are discussed of fabrication and investigation of new types of optical metamaterials based on the use of i) nanoporous dielectric matrices with pores filled with metal; ii) nanosized metal-dielectric structures, iii) self-assembled and oriented metal nanoparticles. A special attention is devoted to fish-net metamaterials possessing optical magnetism and having two- and three-dimension structures with centimeter sizes. There are presented the results of the investigation of metamaterials obtained using the mentioned above technologies. New methods are developed and devices are created for characterization of optical properties of metamaterials.

It seems probable that over the next years optical metamaterials will continue to yield many fundamental results with potential for practical application.

Vladimir Belyi is a Corresponding Member of the National Academy of Sciences of Belarus, Head of the Center "Diagnostic Systems" of the B.I.Stepanov Institute of Physics of National Academy of Sciences of Belarus in Minsk, Belarus. He is a Scientific Manager of the International Stepanov-Fraunhofer Laboratory for Optical Diagnostics. His research interests include optics of crystals, non-linear optics and optical metamaterials. He has received a number of fundamental results in the area of optical transformation of frequency by nonlinear crystals and also studying the properties and the non-linear frequency conversion of new types of laser beams, including so-called Bessel beams. For the cycle of works "Investigation of nonlinear-optical phenomena and creation on this base the new high-efficient sources of laser radiation" the State Prize of the Republic of Belarus in the technical and scientific field of 2000 was awarded to him. For the fundamentals of nonlinear optics of quasi-nondiffracting beams was awarded Skarina Medal in 2006.

September 28 • 15:10–15:50 • PLENARY

On some problems of laser interferometers for the direct detection of gravitational wavess, Vladislav Pustovoit, *Scientific and Technological Ctr. of Unique Instrumentation RAS, Russia.*

Vladislav Pustovoit is a full member of the Russian Academy of Sciences, doctor of physics and mathematics, professor, three times Winner of the USSR and Russia State prize. He is an outstanding expert in the field of scientific instrument design, acousto-electronics, acousto-optics, computer science, physics of semiconductors and metrology. He is the author of more than 230 scientific works including the monograph, and also 31 inventions and patents.

September 28 • 15:50–16:30 • PLENARY

Lasers in modern refractive surgery, Sergey Vartapetov, *Prokhorov General Physics Inst., Russia.*

Motivated and driven by numerous applications and long-standing challenges in strong-field physics, molecular spectroscopy, semiconductor electronics, and standoff detection, ultrafast optical science is rapidly expanding toward longer wavelengths. Recent experiments reveal unique properties of filaments induced by ultrashort laser pulses in the mid-infrared, where the generation of powerful supercontinuum radiation is accompanied by unusual scenarios of optical harmonic generation, giving rise to remarkably broad radiation spectra, stretching from the visible to the mid-infrared. Generation of few- and even single-cycle mid-infrared field waveforms with peak powers ranging from a few megawatts to hundreds of gigawatts has been demonstrated within a broad range of central wavelengths. Below-the-bandgap high-order harmonics generated by ultrashort mid-infrared laser pulses are shown to be ideally suited to probe the nonlinearities of electron bands, enabling an all-optical mapping of the electron band structure in bulk solids. This lecture will provide an overview of exciting new physics behind the recent achievements in this rapidly growing area of ultrafast optical science.

Sergey Vartapetov is a Director of Physics Instrumentation Center (subdivision of Prokhorov General Physics Institute) 2000. He received his PhD from Moscow Physical Technical Physical Institute. Vartapetov's interests include gas discharge lasers and lasers for medical applications,excimer lasers, laser systems for micromachining, LIDAR systems for ozone and pollutants measurements. His professional experience: 1977- 1980 -- the chief of research group at Physics Instrumentation Center, 1980 –- 1990 - the chief of laser subdivision of Physics Instrumentation Center, 1990 –- 2000 - the deputy director,R&D of Physics Instrumentation Center. Dr. Vartapetov is the designer of excimer and fs lasers for refractive surgery and a founder and President of Optosystems Ltd (Troitsk, Moscow) that is a leader on the Russian medical market.

KEYNOTE TALKS

A number of keynote talks are scheduled throughout the ICONO/LAT 2016 Program. These presentations by experts in their respective fields are intended as introductions to important areas in laser physics and its applications.

ICONO SYMPOSIA

Symposium "Diamond and Silicon Carbide Based Quantum Technologies"

Organizers:
Fedor Jelezko, *Inst. for Quantum Optics, Ulm Univ., Germany*
Alexander Nizovtsev, *Stepanov Inst. of Physics, NASB, Belarus*

Symposium "Beyond Non-Linear Optics: High & Extreme Optical Field Physics"

Organizers:
Mikhail Fedorov, *Prokhorov General Physics Inst., Russia*
Mikhail Kalashnikov, *Max Born Inst. for nonlinear optics and short pulse spectroscopy, Germany*
Andrey Savel'ev, *Lomonosov Moscow State Univ., Russia*

Symposium "Topological States and Hall Physics with light"

Organizers:
Sergey Tarasenko, *Ioffe Physical-Technical Inst., Russia*
Evgenii Tolkachev, *Stepanov Inst. of Physics, NASB, Belarus*

Symposium "Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution"

Organizer:
Andrey Naumov, *Inst. of Spectroscopy, Russia*

Symposium "Quantum Optomechanics"

Organizers:
Stefan Danilishin, *Glasgow Univ., UK*
Sergey Vyatchanin, *Lomonosov Moscow State Univ., Russia*

POSTER SESSIONS

Two poster sessions will be held on Tuesday (September 27) and Thursday (September 29) at 18:30–20:00 in the designated areas. For poster presentation each author is provided an A0 size vertical bulletin board. The author is requested to remain in the vicinity of the bulletin board for the duration of the poster session to answer questions.

Authors may set up their posters one hour prior to the assigned session and must remove their posters 1 hour following the session. Posters remaining on boards will be discarded. Push-pins/scotch will be available for set-up. Poster papers are not supplied with any audio-visual or computer equipment. All boards will feature a sign corresponding to the paper number.

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Vitalii Plavskii, *B.I. Stepanov Inst. of Physics, NASB, Belarus*

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Kohzo Hakuta, *Univ. of Electro-Communications, Japan*
Nikolay Kolachevsky, *Lebedev Physical Inst., Russia*
Andrey Klimov, *Univ. de Guadalajara, Mexico*
Aleksander Lvovsky, *Univ. of Calgary, Canada*
Aleksei Taichenachev, *Inst. of Laser Physics, Russia*

2. Quantum Information Science, Engineering, and Technologies

Sergey Kulik, Co-Chair, *Lomonosov Moscow State Univ., Russia*
Dmitri Horoshko, Co-Chair, *Stepanov Inst. of Physics, NASB, Belarus*

Alessandra Gatti, *Inst. di Fotonica e Nanotecnologie, Italy*
Mikhail Kolobov, *Univ. Lille, France*
Christine Silberhorn, *Paderborn Univ., Germany*
Nicolas Treps, *Univ. Pierre et Marie Curie, France*

3. Nanophotonics and Plasmonics

Yuri Kivshar, Co-Chair*, The Australian National Univ., Australia*
Andrey Fedyanin, Co-Chair*, Lomonosov Moscow State Univ., Russia*

Harald Giessen, *Univ. Stuttgart, Germany*
Zubin Jacob, *Univ. of Alberta, Canada*
Romain Quidant, *ICFO, Spain*
Din Ping Tsai, *Research Ctr for Applied Science, Taiwan*

4. Nonlinear Optics and Novel Phenomena

Alexey Zheltikov, Co-Chair*, Lomonosov Moscow State Univ., Russia*
Alexander Grabchikov, Co-Chair*, Stepanov Inst. of Physics, NASB, Belarus*
Yuri Kulchin, Co-Chair*, Inst. of Automation and Control Processes, Russia*

Pavel Apanasevich, *B.I.Stepanov Inst. of Physics, Belarus*
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Concita Sibilia, *La Sapienza Univ. of Rome, Italy*
Aleksei Tolstik, *Belarusian State Univ., Belarus*

5. Nonlinear Space-Time Dynamics, Instabilities, and Patterns

Yaroslav Kartashov, Co-Chair, *Inst. of Spectroscopy, Russia*
Lluis Torner, Co-Chair, *ISFO, Spain*
Vyacheslav Chizhevsky, Co-Chair, *B.I. Stepanov Inst. of Physics, NASB, Belarus*

Claudio Conti, *Univ. Sapienza, Italy*
Andrey Maimisov, *Moscow Engineering Physics Inst., Russia*
Boris Mantsyzov, *Lomonosov Moscow State University*
Boris Malomed, *Tel Aviv Univ., Israel*
Wieslaw Krolikowski, *The Australian Nat. Univ., Australia*
Kestutis Stalinas, *Univ. Politechnica de Catalunya, Spain*
Stefano Trillo, *Univ. of Ferrara, Italy*

6. Symposium "Diamond and Silicon Carbide Based Quantum Technologies"

Fedor Jelezko, Co-Chair, *Inst. for Quantum Optics, Ulm Univ., Germany*
Alexander Nizovtsev, Co-Chair, *B.I. Stepanov Inst. of Physics, NASB, Belarus*

Pavel Baranov, *Ioffe Physical-Technical Inst., Russia*
Dmitry Budker, *Univ. of California at Berkeley, USA; Johanes Gutenberg Univ., Germany*
Philip Hemmer, *Texas A&M Univ., USA*
Mikhail Lukin, *Harvard Univ., USA*
Dieter Suter, *Technical Univ. of Dortmund, Germany*

7. Symposium "Beyond Non-Linear Optics: High & Extreme Optical Field Physics"

Mikhail Fedorov, Co-Chair, *Prokhorov General Physics Inst., Russia*
Mikhail Kalashnikov, Co-Chair, *Max Born Inst. for Nonlinear Optics and Short Pulse Spectroscopy, Germany*
Andrey Savel'ev, Co-Chair, *Lomonosov Moscow State Univ., Russia*

Dimitris Charalambidis, *Univ. of Crete and Foundation for Research and Technology - HELLAS*
Calin Alexandry Ur, *Univ. Politechnica of Bucharest, Romania*
Sargis Ter-Avetisyan, *Inst. for Basic Science, Republic of Korea*
Valery Bychenkov, *Lebedev Physical Inst., Russia*
Efim Khazanov, *Inst. of Applied Physics, Russia*
Wilhelm Becker, *MPI for the Physics of Complex Systems, Germany*

8. Symposium "Topological States and Hall Physics with light"

Sergey Tarasenko, Co-Chair, *Ioffe Physical-Technical Inst., Russia*
Evgenii Tolkachev, Co-Chair, *B.I.Stepanov Inst. of Physics, NASB, Belarus*

Guillaume Malpuech, *Inst. Pascal, France*
Sergey Ganichev, *Univ. of Regensburg, Germany*
Alexander Furs, *Belarusian State Univ., Belarus*
Alexander Khanikaev, *City Univ. of New York, USA*

9. Symposium "Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution"

Andrey Naumov, Co-Chair, *Inst. of Spectroscopy, Russia*

Andriy Chmyrov, *Helmholtz Zentrum Munchen, Germany*
Igor Dushkin, *NanoScanTechnology, Russia*
Boleslaw Kozankiewicz, *Inst. of Physics, Poland*
Taras Plakhotnik, *Univ. of Queensland, Australia*
Ivan Scheblykh, *Lund Univ., Sweden*
Aleksander Starukhin, *B.I. Stepanov Inst. of Physics, NASB, Belarus*
Thobias Utikal, *MPI for the Science of Light, Germany*

10.Symposium "Quantum Optomechanics"

Stefan Danilishin, Co-Chair, *Glasgow Univ., UK*
Sergey Vyatchanin, Co-Chair, *Lomonosov Moscow State Univ., Russia*

LAT PROGRAM COMMITTEE

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Igor Bufetov, *Prokhorov General Physics Inst., Russia*
Nikolay Kuleshov, *Belarusian National Technical University, Belarus*
Irina Sorokina, *Norwegian University of Science and Technology, Norway*

2. Laser Remote Sensing and Tunable Diode Laser Spectroscopy

Vladislav Mikhalevich, *Prokhorov General Physics Inst., Russia*
Anatoly Chaikovsky, *B.I.Stepanov Inst. of Physics, NASB, Belarus*

3. Ultra-Fast Diagnostics in Laser Research

Mikhail Schelev, *Prokhorov General Physics Inst., Russia*
Konstantin Vereshchagin, *Prokhorov General Physics Inst., Russia*
Sergei Tikhomirov, *B.I.Stepanov Inst. of Physics, NASB, Belarus*

4. Biophotonics and Laser Biomedicine

Viktor Loschenov, *Prokhorov General Physics Inst., Russia*
Rudolf Steiner, *Institut für Lasertechnologien in der Medizin, Germany*
Boris Dzhagarov, *B.I. Stepanov Inst. of Physics, NASB, Belarus*

5. Nanomaterials for Lasers

Elena Obraztsova *Prokhorov General Physics Inst., Russia*
Sergey Gaponenko *B.I. Stepanov Inst. of Physics, Belarus*
Sergey Maksimenko *Belarusian State Univ., Inst. for Nuclear Problems, Belarus*

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Svetlana Kurilkina (Belarus)
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Maria Kulagina (Belarus)

GENERAL INFORMATION

REGISTRATION

The ICONO/LAT 2016 Registration Desk will be located at the National Cultural Center during the following hours:

ICONO/LAT Registration Hours	
Monday, September 26	08:00–18:00
Tuesday, September 27	08:30–18:00
Wednesday, September 28	08:30–18:00
Thursday, September 29	08:30–18:00

What Does the Full Registration Fee Include?

The full registration for the ICONO/LAT 2016 conferences includes:

- Admission to all ICONO/LAT 2016 technical sessions;
- One copy of the Conference Program and Technical Digest in electronic form;
- Coffee breaks scheduled in the Conference Program;
- Admission to the Conference Welcome Reception;
- Guided tour around Minsk (information will be posted in the registration area).

Registration Fees

	Before September 1, 2016	After September 1, 2016
Full registration	450 EUR	500 EUR
Full-time Student	200 EUR	250 EUR
Conference Dinner Ticket	50 EUR	50 EUR

Students must provide student identification at the time of registration to be granted student full registration prices.

CONFERENCE PUBLICATIONS

Conference Program

This *Conference Program* will be handled to all the conference attendees at the registration.

Technical Digests

The Technical Digests for ICONO/LAT 2016 will consists of camera-ready summaries submitted by all authors. Attendees will receive the combined ICONO/LAT 2016 Digests when they register. Additional copies are available for purchase at the meeting at the special conference price of 30 EUR. The digests will be available after the conference from the Conference Organizers at a higher price.

CONFERENCE SERVICES

Message and Conference Information Center

A Message Desk and Conference Information Center will be located at the Registration area. Messages will be posted for attendees on a message board. Working hours correspond to those of registration hours.

Speaker/Presider Check

To ensure that the program runs smoothly, all speakers are requested to report to the ICONO/LAT Organizing Committee room located in the registration area. Presiders are requested to identify themselves at least 30 minutes before the session begins to the audiovisual personnel for a quick review of equipment and procedures.

Audiovisual Equipment

The meeting room will contain the following equipment:

- Podium microphone (when necessary).
- Data Projector for computer presentations and a PC under MS Windows with installed MS PowerPoint and Adobe Acrobat Reader. MAC users must bring a respective DVI (or mini-DVI)-VGA connector to connect their own notebooks.
- Laser pointer.
- Screen.
- 60 minute timer.

WELCOME TO MINSK, BELARUS

The ICONO/LAT 2016 will be organized in Minsk, Belarus.

The oldest mentions of Minsk, the capital and largest city in Belarus, date back to the 11th century (1067). In 1242 Minsk became a part of the Grand Duchy of Lithuania and received its town privileges in 1499. From 1569 it was a capital of the Minsk Voivodship in the Polish-Lithuanian Commonwealth. In 1793 Belarus became a part of the Russian Empire. During 1919–1991 Minsk was the capital of the Byelorussian Soviet Socialist Republic. In 1991 Minsk became the capital of independent Belarus.

Minsk is a mind-blowing experience. Ostensibly a European capital, the city hearkens back to Soviet times: the clean streets are lined with more Soviet iconography than you can shake a sickle at. There's a palpable pride of the survivor about Minsk - it has risen from the dead several times. Reduced to rubble during WWII, architects were given a blank slate to transform ruins into a model Soviet city. Today it's a clean, safe city with many tourist attractions, best enjoyed as locals do - among interesting people in cafes, parks and kicking clubs.

Etiquette and Customs

Greeting someone

A simple handshake is sufficient for most occasions. Address the person with his/her title and last name until requested to use their first name. If visiting someone in a more social setting, it is customary to bring a small gift such as wine, flowers or chocolate.

Tipping advice

Tipping is left to your discretion if the service warrants it. An amount of 10 to 15 percent is sufficient.

Dress code

For business, attire is the same as in any major capital city, i.e. smart suits. When visiting tourist attractions such as churches, remember that Belarus is at large a Christian Orthodox country and women are requested to cover their heads.

Minsk Weather

Autumn is a great and favorite time of the year to visit Minsk, the capital of Belarus. Generally, autumn begins in mid of September and lasts to late November. Autumn can be quite cold, but the weather warms up in early autumn, so you'll be comfortable here in a traditional autumn jacket and footwear.

Be sure to bring an umbrella for the rainy days of autumn. It is also a good idea to bring along a backpack or carrying case of some sort to stash your souvenirs and other purchases as you explore the many city sights and attractions and suburban parks and palaces.

Sightseeing Program

An extended sightseeing program is offered to the conference participants and accompanying persons. Please contact the travel agency table at the registration area for details.

Conference Venue

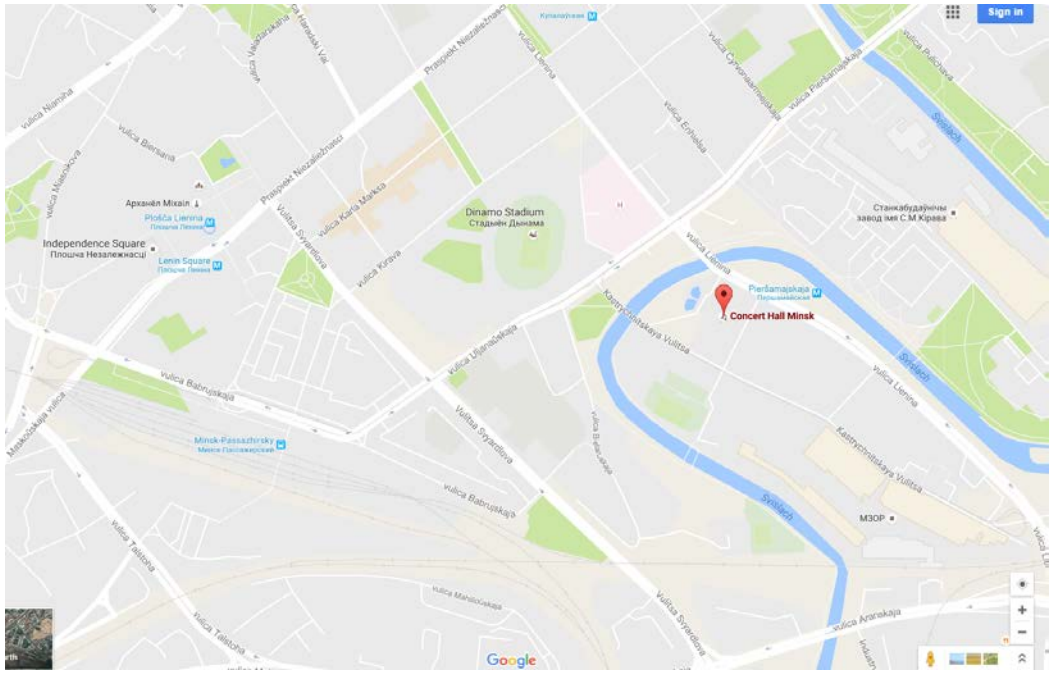
The ICONO/LAT 2016 conference will be held in the National Cultural Ctr. (http://www.rkpc.by/), which is conveniently situated on the Svislach river, which crosses Minsk, within walking distance to the sights of major interest and most hotels. Metro station "Pervomayskaya" is also located nearby.

Address

National Cultural Center
Oktyabrskaya str. 5
Minsk 220030 Belarus

How to get there?

By metro: take "Pervomayskaya" metro station. By tram: Take trams Nos 1, 2, 4, 7, 8. Exit at the Stadium Dinamo.



AGENDA OF SESSIONS

ICONO 2016 TOPICS

ICONO-01: Quantum and Atom Optics

ICONO-02: Quantum Information Science, Engineering, and Technologies

ICONO-03: Nanophotonics and Plasmonics

ICONO-04: Nonlinear Optics and Novel Phenomena

ICONO-05: Nonlinear Space-Time Dynamics, Instabilities, and Patterns

ICONO-06: Symposium “Diamond and Silicon Carbide Based Quantum Technologies”

ICONO-07: Symposium “Beyond Non-Linear Optics: High & Extreme Optical Field Physics”

ICONO-08: Symposium “Topological States and Hall Physics with Light”

ICONO-09: Symposium “Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution”

ICONO-10: Symposium “Quantum Optomechanics”

LAT 2016 TOPICS

LAT-01: Laser Systems and Materials

LAT-02: Laser Remote Sensing and Tunable Diode Laser Spectroscopy

LAT-03: Ultra-Fast Diagnostics in Laser Research

LAT-04: Biophotonics and Laser Biomedicine

LAT-05: Nanomaterials for Lasers

AGENDA OF SESSIONS

MONDAY, SEPTEMBER 26, 2016

Hall 1	Hall 2	Hall 3
	REGISTRATION	
11:00–13:00 IMA • Quantum and Atom Optics I (ICONO-01/1)	11:00–13:15 IMB • Symposium “Topological States and Hall Physics with Light” (ICONO-08)	11:00–13:00 IMC • Quantum Information Science, Engineering, and Technologies I (ICONO-02/1)
13:00–13:30 COFFEE BREAK		
	13:30–16:00 PMA • Plenary Lectures I (Big Hall)	
16:00–16:30 COFFEE BREAK		
16:30–18:30 IMD • Quantum and Atom Optics II (ICONO-01/2)	16:30–18:30 IME • Symposium “Diamond and Silicon Carbide Based Quantum Technologies” I (ICONO-06/1)	16:30–18:30 IMF • Quantum Information Science, Engineering, and Technologies II (ICONO-02/2)
18:30–20:00 WELCOME RECEPTION		

AGENDA OF SESSIONS

MONDAY, SEPTEMBER 26, 2016

Hall 4	Hall 5	
REGISTRATION		
11:00–12:45 LMA • Laser Remote Sensing and Tunable Diode Laser Spectroscopy I (LAT-02/1)	11:00–13:00 LMB • Laser Systems and Materials I (LAT-01/1)	
13:00–13:30 COFFEE BREAK		
13:30–16:00 PMA • Plenary Lectures I (Big Hall)		
16:00–16:30 COFFEE BREAK		
16:30–18:00 LMC • Laser Remote Sensing and Tunable Diode Laser Spectroscopy II (LAT-02/2)	16:30–18:30 LMD • Laser Systems and Materials II (LAT-01/2)	
18:30–20:00 WELCOME RECEPTION		

AGENDA OF SESSIONS

TUESDAY, SEPTEMBER 27, 2016

Hall 1	Hall 2	Hall 3
9:00–11:00 ITuA • Quantum and Atom Optics III (ICONO-01/3)	9:00–11:00 ITuB • Symposium "Diamond and Silicon Carbide Based Quantum Technologies" II (ICONO-06/2)	9:00–11:00 LTuA • Nanomaterials for Lasers I (LAT-05/1)
11:00–11:30 COFFEE BREAK		
11:30–13:15 ITuC • Quantum and Atom Optics IV (ICONO-01/4)	11:30–13:30 **ITuD** • Symposium "Diamond and Silicon Carbide Based Quantum Technologies" III (ICONO-06/3)	11:30–13:00 LTuD • Nanomaterials for Lasers II (LAT-05/2)
13:00–14:30 LUNCH (on your own)		
14:30–16:00 ITuE • Nonlinear Space-Time Dynamics, Instabilities, and Patterns I (ICONO-05/1)	14:30–16:15 **ITuF** • Symposium "Beyond Non-Linear Optics: High & Extreme Optical Field Physics" I (ICONO-07/1)	14:30–16:30 ITuG • Nonlinear Optics and Novel Phenomena I (ICONO-04/1)
16:30–17:00 COFFEE BREAK		
17:00–18:30 ITuH • Nonlinear Space-Time Dynamics, Instabilities, and Patterns II (ICONO-05/2)	17:00–18:30 ITuI • Symposium "Beyond Non-Linear Optics: High & Extreme Optical Field Physics" II (ICONO-07/2)	17:00–18:15 ITuJ • Nonlinear Optics and Novel Phenomena II (ICONO-04/2)
18:30–20:00 ICONO/LAT POSTER SESSION I **ICONO-01 (ITuK/15), ICONO-02 (ITuL/2), ICONO-05 (ITuM/9), ICONO-06** **(ITuN/3), ICONO-07 (ITuO/3), LAT-01 (LTuK/59), LAT-02 (LTuL/13), LAT-03 (LTuM8)**		

AGENDA OF SESSIONS

TUESDAY, SEPTEMBER 27, 2016

Hall 4	Hall 5	
9:00–11:00 LTuB • Laser Remote Sensing and Tunable Diode Laser Spec-tros-copy III (LAT-02/3)	9:00–11:00 LTuC • Laser Systems and Materials III (LAT-01/3)	
11:00–11:30 COFFEE BREAK		
11:30–13:30 LTuE • Laser Remote Sensing and Tunable Diode Laser Spec-troscopy IV (LAT-02/4)	11:30–13:00 LTuF • Laser Systems and Materials IV (LAT-01/4)	
13:00–14:30 LUNCH (on your own)		
14:30–16:30 LTuG • Ultra-Fast Diagnostics in Laser Research I (LAT-03/1)	14:30–16:30 LTuH • Laser Systems and Materials V (LAT-01/5)	
16:30–17:00 COFFEE BREAK		
17:00–18:45 LTuI • Ultra-Fast Diagnostics in Laser Research II (LAT-03/2)	17:00–18:30 LTuJ • Laser Systems and Materials VI (LAT-01/6)	
18:30–20:00 ICONO/LAT POSTER SESSION I **ICONO-01 (ITuK/15), ICONO-02 (ITuL/2), ICONO-05 (ITuM/9), ICONO-06** **(ITuN/3), ICONO-07 (ITuO/3), LAT-01 (LTuK/59), LAT-02 (LTuL/13), LAT-03 (LTuM8)**		

AGENDA OF SESSIONS

WEDNESDAY, SEPTEMBER 28, 2016

Hall 1	Hall 2	Hall 3
9:00–11:00 IWA • Nonlinear Space-Time Dynamics, Instabilities, and Patterns III (ICONO-05/3)	9:00–10:45 IWB • Symposium “Beyond Non-Linear Optics: High & Extreme Optical Field Physics” III (ICONO-07/3)	9:00–10:45 IWC • Nonlinear Optics and Novel Phenomena III (ICONO-04/3)
11:00–11:30 COFFEE BREAK		
	11:30–13:30 PWB ● Plenary Lectures II (Big Hall)	
13:30–15:00 LUNCH (on your own)		
15:00–16:45 IWD • Nonlinear Space-Time Dynamics, Instabilities, and Patterns IV (ICONO-05/4)	15:00–16:30 IWE • Symposium “Beyond Non-Linear Optics: High & Extreme Optical Field Physics” IV (ICONO-07/4)	15:00–16:30 IWF • Nonlinear Optics and Novel Phenomena IV (ICONO-04/4)
16:30–17:00 COFFEE BREAK		
17:00–18:15 LWE • Nanomaterials for Lasers III (LAT-05/3)	17:00–18:30 IWG • Nanophotonics and PlasmonicsI (ICONO-03/1)	17:00–18:30 IWH • Nonlinear Optics and Novel Phenomena V (ICONO-04/5)
18:30–20:00 CONFERENCE DINNER		

AGENDA OF SESSIONS

WEDNESDAY, SEPTEMBER 28, 2016

Hall 4	Hall 5	
9:00–11:00 LWA • Biophotonics and Laser Biomedicine I (LAT-04/1)	9:00–11:00 LWB • Laser Systems and Materials VII (LAT-01/7)	
11:00–11:30 COFFEE BREAK		
11:30–13:30 PWB ● Plenary Lectures II (Big Hall)		
13:30–15:00 LUNCH (on your own)		
15:00–16:45 LWC • Biophotonics and Laser Biomedicine II (LAT-04/2)	15:00–16:45 LWD • Ultra-Fast Diagnostics in Laser Research III (LAT-03/3)	
16:30–17:00 COFFEE BREAK		
17:00–18:30 LWF • Biophotonics and Laser Biomedicine III (LAT-04/3)	17:00–18:30 LWG • Ultra-Fast Diagnostics in Laser Research IV (LAT-03/4)	
18:30–20:00 CONFERENCE DINNER		

AGENDA OF SESSIONS

THURSDAY, SEPTEMBER 29, 2016

Hall 1	Hall 2	Hall 3
9:00–11:00 IThA • Symposium “Quantum Optomechanics” I (ICONO-10/1)	9:00–11:00 IThB • Nanophotonics and Plasmonics II (ICONO-03/2)	9:00–11:00 IThC • Nonlinear Optics and Novel Phenomena VI (ICONO-04/6)
11:00–11:30 COFFEE BREAK		
11:30–13:30 IThD • Symposium “Quantum Optomechanics” II (ICONO-10/2)	11:30–13:00 IThE • Nanophotonics and Plasmonics III (ICONO-03/3)	11:30–13:00 IThF • Nonlinear Optics and Novel Phenomena VII (ICONO-04/7)
13:00–14:30 LUNCH (on your own)		
14:30–16:30 IThG • Symposium “Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution” I (ICONO-09/1)	14:30–16:30 IThH • Nanophotonics and Plasmonics IV (ICONO-03/4)	14:30–16:30 IThI • Nonlinear Optics and Novel Phenomena VIII (ICONO-04/8)
16:30–17:00 COFFEE BREAK		
17:00–18:30 IThJ • Symposium “Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution” II (ICONO-09/2)	17:00–18:30 IThK • Nanophotonics and Plasmonics V (ICONO-03/5)	
18:30–20:00 ICONO/LAT POSTER SESSION II **ICONO-03 (IThL/35), ICONO-4 (IThM/44), ICONO-9 (IThN/4),** **LAT-04 (LThE/26), LAT-05 (LThF4)**		

AGENDA OF SESSIONS

THURSDAY, SEPTEMBER 29, 2016

Hall 4	Hall 5	
9:00–11:15 LThA • Biophotonics and Laser Biomedicine IV (LAT-04/4)		
11:00–11:30 COFFEE BREAK		
11:30–13:00 LThB • Biophotonics and Laser Biomedicine V (LAT-04/5)		
13:00–14:30 LUNCH (on your own)		
14:30–16:30 LThC • Biophotonics and Laser Biomedicine VI (LAT-04/6)		
16:30–17:00 COFFEE BREAK		
17:00–18:45 LThD • Biophotonics and Laser Biomedicine VII (LAT-04/7)		
18:30–20:00 ICONO/LAT POSTER SESSION II **ICONO-03 (IThL/35), ICONO-4 (IThM/44), ICONO-9 (IThN/4),** **LAT-04 (LThE/26), LAT-05 (LThF4)**		

AGENDA OF SESSIONS

FRIDAY, SEPTEMBER 30, 2016

Hall 1	Hall 2	Hall 3
9:00–11:00 IFA • Symposium “Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution” III (ICONO-09/3)	9:00–11:00 IFB • Nanophotonics and Plasmonics VI (ICONO-03/6)	
11:00–11:30 COFFEE BREAK		
	11:30–13:00 IFC • Nanophotonics and Plasmonics VII (ICONO-03/7)	
CLOSING		

ICONO/LAT2016

TECHNICAL PROGRAM ABSTRACTS

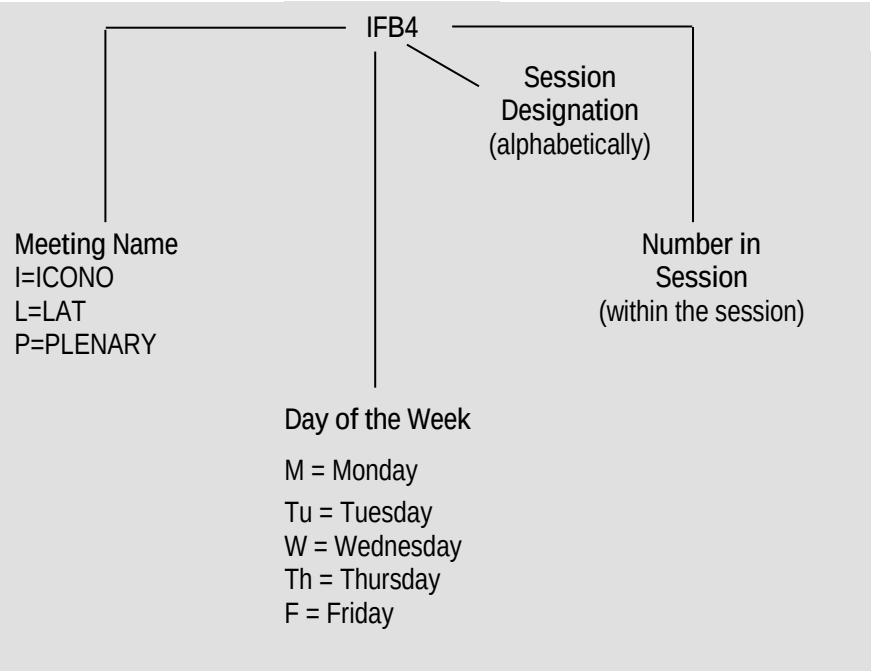
KEY TO SHADING

ICONO

LAT Sessions

Explanation of Session Codes

The first letter of the code indicates the name of the meeting: ICONO (I), LAT (L), PLENARY (P). The second character designates the day of the week (Monday = M, Tuesday = Tu, Wednesday = W, Thursday = Th, Friday = F). The next character indicates the session within that particular day of the paper is given. Each day begins with a letter A and continues alphabetically. The number of the end of the code signals the position of the paper within the session (first, second, third, etc.). For example, a session number IFB4 would indicate that this paper is an ICONO paper, being presented on Friday during session B, and the fourth paper (4) presented in that session.



Hall 1
ICONO-01/1

11:00–13:00
IMA • Quantum and Atom Optics I (ICONO-01/1)
Jacob Sherson, *Aarhus Univ., Denmark, Chair*

IMA1 • 11:00-11:45 • KEYNOTE
Chiral quantum optics, Arno Rauschenbeutel, *Vienna Center for Quantum Science and Technology, Atominstitut, Austria.* Tightly confined light fields exhibit an inherent link between their local polarization and propagation direction. Their interaction with emitters therefore features chiral, i.e., propagation direction-dependent, effects which are interesting both conceptually and for quantumphotonic applications.

Hall 2
ICONO-08/1

11:00-13:15
IMB ● Topological States and Hall Physics with Light I (ICONO-08/1)
Dmitry Skryabin*, Department of Physics Univ. of Bath., UK, Chair*

IMB1 • 11:00-11:30 • INVITED
Topological effects based on spin-orbit coupling of cavity polaritons, D.D. Solnyshkov, O. Bleu, A.V. Nalitov, G. Malpuech, *Univ. Blaise Pascal, France.* We study the TE-TM splitting in polariton graphene, tracing the phase diagram of a Z topological insulator, and in zigzag chains, where stable dark-bright solitons appear via the Kibble-Zurek mechanism.

IMB2 • 11:30-12:00 • INVITED
Magnetospectroscopy of novel 2D topological insulators, V.I. Gavrilenko, *Inst. for Physics of Microstructures, Russia.* Band structure of double HgTe/CdHgTe QWs and three-layer InAs/GaSb/InAs QWs has been studied. New phases which have no analogs in single HgTe/CdHgTe QWs and dual-layer InAs/GaSb QWs are predicted and tested by THz magnetospectroscopy.

Hall 3
ICONO-02/1

11:00-13:00
IMC ● Quantum Information Science, Engineering, and Technologies I (ICONO-02/1)
Gerd Leuchs, *Max Planck Inst. for the Science of Light, Germany, Chair*

IMC1 • 11:00-11:45 • KEYNOTE
States and modes in quantum optics, Claude Fabre, *Laboratory Kastler Brossel Univ. Pierre et Marie Curie Sorbonne Univ. Paris, France.* Quantum Optics, as the child of Optics and Quantum Mechanics, has inherited a double linearity: that of Maxwell equations, which use optical modes as a basis of solutions, and that of the Schrödinger equation, which uses quantum state bases. It turns out to be very fruitful to consider these two bases on an equal footing and to tailor quantum fields not only in a priori given modes, but also to optimize the spatio-temporal shapes of the modes in which the state is defined. I will give in the talk several examples of such an approach in quantum metrology and quantum information processing with highly multimode quantum states.

Hall 4
LAT-02/1

11:00-12:45
LMA ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/1)
Mikhalevich Vladislav, Pershin Sergey Mikhailovich, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*

LMA1 • 11:00-11:30 • INVITED
Characteristics of atmospheric dust and cirrus clouds derived from multi-wavelength Raman lidar measurements during SHADOW campaign in Senegal., I. Veselovskii, P. Goloub, T. Podvin, D. Tanre, M. Korenskiy, Q. Hu, *Physics Instrumentation Centre by A.M. Prokhorov General Physics Inst., RAS, Moscow.* West Africa is important locations for studying dust properties and their influence on weather and climate. In our presentation we provide the results of multiwavelength lidar measurements performed in Senegal in the frame aof SHADOW campaign. The lidar observations performed in 2015-2016 allowed to accumulate significant amount of information about dust and cirrus clouds optical properties.

LMA2 • 11:30:12:00 • INVITED
Optical Studies of the Atmosphere and Surface in Antarctica, E. Zege, I. Katsev, M. Korol, F. Goloub, A. Ivanov, L. Blarel, S. Denisov, V. Dick, A. Malinka, F. Osipenko, T. Podvin, A. Prikhach, L. Chaikovskaya, A. Fedarenka, A. Lapyonok, V. Svidinsky, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The paper presents the techniques and results of lidar, spectral radiometric and satellite observations of atmosphere & surface properties in the Antarctic coastal zone obtained by team IP NASB (Belarus) from 2008 to 2016.

Hall 5
LAT-01/1

11:00-13:00
LMB ● Laser System and Materials I (LAT-01/1)
Nikolay Kuleshov, *Belarusian National Technical Univ., Belarus, Chair*

LMB1 • 11:00-11:45 • KEYNOTE
Recent developments in visible rare-earth-doped lasers, C. Kränkel, *Universität Hamburg, Institut für Laser-Physik, Germany.* I will report on visible semiconductor-laser pumped Tb$\^{3+}$- and Pr$\^{3+}$-doped lasers. Routinely watt-level output powers at >50% efficiency are obtained at different visible wavelengths and a wide tuning range is covered in wavelength tuning experiments.

Hall 1
ICONO-01/1

11:00–13:00
IMA • Quantum and Atom Optics I (ICONO-01/1)—Continued

IMA2 • 11:45-12:15 • INVITED
Quantum frequency conversion of single photons: How to interface single atoms with single telecom photons, Christoph Becher*, Saarland Univ., Germany.* We present the technique of quantum frequency conversion to transduce single photons from visible/near-infrared wavelengths to telecom bands, preserving classical and quantum properties. As example we demonstrate telecom-heralded absorption of single photons by a single ion.

IMA3 • 12:15-12:45 • INVITED
Quantum optics with solid state artificial atoms, L. De Santis, C. Anton, N. Somaschi, V. Giesz, G. Coppola, G. Hornecker, B. Reznychenko, J. C. Loredo, M. P. Almeida, C. Gomez, I. Sagnes, A. Lemaitre, A. Auffeves, A. G. White, N. D. Lanzillotti-Kimura, L. Lanco and P. Senellart, *C2N Centre for Nanoscience and Nanotechnology, France.* We present a quantum dot/cavity device that performs as a bright source of single and indistinguishable photons and demonstrate the coherent manipulation of a two-level system at the few photons scale using the same device.

Hall 2
ICONO-08/1

11:00-13:15
IMB ● Topological States and Hall Physics with Light I (ICONO-08/1)—Continued

IMB3 • 12:00-12:30 • INVITED
Terahertz radiation induced photocurrents in topological insulators, V. Bel'kov, *Ioffe Inst., Russia.* Photocurrents generated in the topologically protected surface states of three dimensional topological insulators have been observed and studied. It was demonstrated that the effect provides an optoelectronic method to selectively excite and investigate high frequency transport of the Dirac fermions in these materials. The microscopic mechanisms of the effects are discussed.

Hall 3
ICONO-02/1

11:00-13:00
IMC ● Quantum Information Science, Engineering, and Technologies I (ICONO-02/1)—Continued

IMC2 • 11:45-12:15 • INVITED
Free-space quantum signatures using heterodyne measurements, N. Korolkova, C. Croal, Ch. Peuntinger, I. Khan, M. Thornton, P. Wallden, E. Andersson, Ch. Marquardt, G. Leuchs*, Univ. of St. Andrews, UK.* Quantum signatures guarantee the authorship of communications. Their unconditional security is ensured by quantum mechanics. We experimentally demonstrate feasibility of quantum signatures based on heterodyne measurements by distributing signature states through 1.6km real free-space channel.

IMC3 • 12:15-12:30 • ORAL
Overcoming vacuum noise: The unforeseen benefits of quantum heterodyne detection, C.R. Müller, C. Peuntinger, Th. Dirmeier, I. Khan, U. Vogl, C. Marquardt, G. Leuchs, L.L. Sánchez-Soto, Y.S. Teo, Z. Hradil, and J. Řeháček, *Max Planck Inst. for the Science of Light, Inst. of Optics, Information and Photonics, Univ. of Erlangen-Nuremberg (FAU), Germany.* We experimentally demonstrate that, contrary to a common believe, heterodyne detection outperforms homodyne tomography for almost all Gaussian states. Our results reveal the operational differences between the theoretically equivalent concepts of Wigner- and Husimi Q-functions.

Hall 4 LAT-02/1	Hall 5 LAT-01/1	
11:00-12:45 LMA ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/1)—Continued	11:00-13:00 LMB ● Laser System and Materials I (LAT-01/1)—Continued	
	LMB2 • 11:45-12:15 • INVITED *Novel Red Europium Lasers Based on Monoclinic Double Tungstates,* P. Loiko, V. Dashkevich, A. Pavlyuk, *Center for Optical Materials and Technologies, Belarusian National Technical Univ., Belarus.* We report on recent progress in the development of red europium lasers (~702 nm, 5D0 →7F4 transition) based on monoclinic double tungstates Eu^{3+}:KRE(WO4)2 where RE = Gd, Y or Lu and operating at room-temperature.	
LMA3 • 12:00-12:15 • ORAL *Investigation of crater evolution during laser treating of materials,* A.Yu. Ivanov, A.V. Kapytsky, V.I. Nedolugov, S.V. Vasil'ev, *Grodno State Univ., Belarus.* Acoustic emission of a zone of the destruction formed during influence of pulse laser radiation on a surface of metal is considered. Dependence of the time form of acoustic fluctuations on parameters of an irradiated material and the law of increase in depth of a crater was estimated. It is revealed, that at action on a surface of the copper sample of a laser impulse duration ~ 20 mks time of growth of a zone of destruction makes approximately 40 mks .		
LMA4 • 12:15-12:30 • ORAL *Multifrequency Lidar Sensing of Atmospheric Aerosol under Conditions of Information Uncertainty,* S.S. Lisenko, M.M. Kugeiko, V.V. Khomich, *Belorussian State Univ., Belarus.* A technique is considered for retrieving the spatial distributions of respirable fractions of aerosol in the lower atmosphere on the basis of multifrequency lidar sounding data without the use of a priori data on the optical and microphysical aerosol parameters along a sounding path.	LMB3 • 12:15-12:30 • ORAL *Ponderomotor Forces Impact on Properties of UV Solid-State Laser,* V.V. Semashko, O.R. Akhtyamov, A.S. Nizamutdiniov, M.A. Marisov, E. Sarantopoulou and A.C. Cefalas, *Kazan Federal Univ., Russia.* Incident pumping laser radiation initiates diffusion of molecules and impurities particles adsorbed on surface of solid-state active media (SSAM) into the bulk and leads to laser properties degradation. In contrast, transmitted through the SSAM laser beam cleans the exit aperture.	

Hall 1
ICONO-01/1

11:00–13:00
IMA • Quantum and Atom Optics I (ICONO-01/1)—Continued

IMA4 • 12:45-13:00 • ORAL
Non-stationary and relaxation phenomena in cavity-assisted quantum memory for light, N.G. Veselkova, A.N. Vetlugin, and I.V. Sokolov, *Saint Petersburg State Univ., Russia.* We consider storage and retrieval of light signals of finite duration, as compared to the cavity lifetime, in presence of relaxation and light-induced level shifts of cold atoms used as storage medium. Method of optimal control of the atom-field coupling allowing for effective manipulation of both amplitude and phase of the signals is presented.

Hall 2
ICONO-08/1

11:00-13:15
IMB • Topological States and Hall Physics with Light I (ICONO-08/1)—Continued

IMB4 • 12:30-13:00 • INVITED
Topological edge states in one-dimensional arrays: towards nonlinear topological photonics, M. A. Gorlach, A. P. Slobozhanyuk, I. S. Sinev, A. K. Samusev, I. S. Mukhin, Y. F. Yu, A. I. Kuznetsov, A. E. Miroshnichenko, P. A. Belov, A. N. Poddubny and Yu. S. Kivshar, *Nonlinear Physics Center, Australian National Univ., Australia.* We demonstrate experimentally that zigzag arrays of nanoparticles support topologically protected edge states. Based on direct near-field measurements, we observe the selective excitation of the edge states controlled by the polarization of an incident light.

IMB5 • 13:00-13:15 • ORAL
Addition, subtraction and cancellation of optical topological charges in two-photon excited Rb vapour, A.M. Akulshin, I. Novikova, E.E. Mikhailov, S.A. Suslov, and R.J. McLean, *Swinburne Univ. of Technology, Australia.* Transfer of orbital angular momenta from resonant laser light to frequency up- and down-converted radiation in two-photon excited Rb vapour is demonstrated. A new procedure for distinguishing nonlinear processes in atomic media is suggested.

Hall 3
ICONO-02/1

11:00-13:00
IMC • Quantum Information Science, Engineering, and Technologies I (ICONO-02/1)—Continued

IMC4 • 12:30-12:45 • ORAL
Experimental adaptive tomography of quantum states and processes, G.I. Struchalin, I.A. Pogorelov, S.S. Straupe, K.S. Kravtsov, I.V. Radchenko, S.P. Kulik, *Lomonosov Moscow State Univ., Faculty of Physics, Russia.* We discuss an adaptive Bayesian approach to quantum state and process tomography optimizing the measurements with respect to information gain. We experimentally show that adaptive tomography outperforms standard techniques in estimation quality.

IMC5 • 12:45-13:00 • ORAL
Measuring incompatible observables on a single photon, F. Piacentini, M. P. Levi, A. Avella, E. Cohen, R. Lussana, F. Villa, A. Tosi, F. Zappa, M. Gramegna, G. Brida, I. P. Degiovanni, and M. Genovese, *INRIM, Italy.* A characteristic trait of Quantum Mechanics is the impossibility of measuring at the same time non-commuting observables, that can be partially relaxed when considering joint or sequential weak values. Here we show the first realization of the sequential weak value evaluation of two incompatible observables on a single photon.

Hall 4 LAT-02/1	Hall 5 LAT-01/1	
11:00-12:45 LMA ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/1)—Continued	11:00-13:00 LMB ● Laser System and Materials I (LAT-01/1)—Continued	
LMA5 • 12:30-12:45 • ORAL ***Sensitive, Time-Resolved and Broadband Measurements in Shock Tubes and Electric Discharges using Intracavity Absorption Spectroscopy with Home-Made Fiber Lasers,*** P. Fjodorow, M. Fikri, C. Schulz, V.M. Baev, *Univ. of Duisburg-Essen, Inst. for Combustion and Gas Dynamics - Reactive Fluids, Germany.* Intracavity absorption spectroscopy is applied to sensitive, time-resolved and broadband measurements of (i) gain and absorption in xenon plasma, and (ii) simultaneous determination of temperature, partial pressure of C2H2 and total pressure of shock-heated C2H2/Ar-mixture.	LMB4 • 12:30-12:45 • ORAL ***Excited - state absorption spectra of Pr3+ ions doped into LiY1-xLuxF4 mixed crystals,*** V. G. Gorieva, S. L. Korableva, V. V. Semashko, *Kazan Federal Univ., Russia.* the UV/visible polarized excited – state absorption (ESA) spectra from the 1D2 and 3Pj manifolds of 4f2-configuration of Pr3+ ions doped into LiY1-xLuxF4:Pr3+ mixed crystals were studied at room temperature. These data are necessary to estimate an efficiency of stepwise excitation of 4f5d-states of Pr3+ ions in these crystals	
	LMB5 • 12:45-13:00 • ORAL ***High-power solid state lasers and spectral instruments in a variety of applications,*** I. Kalitukho, A. Protasenya, *JSC SolarLS, Belarus.* Presentation of modern laser systems and spectral equipment intended for a wide choice of different applications such as: LIBS, new materials spectroscopy, photovoltaics, plasma physics, raman spectroscopy, fluorometry, LIDAR.	

Big Hall
PLENARY SESSION I

13:30-16:00
PMA ● Opening and Plenary Session I
To be announced.

PMA1 • 13:10-14:00
Tribute to Rem Khokhlov, V.A. Makarov, *Lomonosov Moscow State Univ., Russia*. With this talk we pay tribute to Rem Khokhlov, a world-known soviet scientist and a pioneer of Laser Physics, Nonlinear Optics, and Nonlinear Acoustics whose 90th jubilee we do celebrate this year. The range of scientific interests of Rem Khokhlov was very wide. To him belong fundamental results in nonlinear theory of oscillations, in quantum electronics, in optics and in acoustics. World fame was brought to Rem Khokhlov by his works on the theory of nonlinear wave processes, nonlinear optics, tunable lasers, and interaction of intense radiation with matter.

PMA2 • 14:00-15:00 • PLENARY
Ultrafast nonlinear optics in the mid-infrared: Here be dragons, A.M. Zheltikov, *Lomonosov Moscow State Univ., Russia; Kurchatov Inst., Russia; Russian Quantum Ctr, Russia; Texas A&M Univ., USA.* Motivated and driven by numerous applications and long-standing challenges in strong-field physics, molecular spectroscopy, semiconductor electronics, and standoff detection, ultrafast optical science is rapidly expanding toward longer wavelengths. Recent experiments reveal unique properties of filaments induced by ultrashort laser pulses in the mid-infrared, where the generation of powerful supercontinuum radiation is accompanied by unusual scenarios of optical harmonic generation, giving rise to remarkably broad radiation spectra, stretching from the visible to the mid-infrared. Generation of few- and even single-cycle mid-infrared field waveforms with peak powers ranging from a few megawatts to hundreds of gigawatts has been demonstrated within a broad range of central wavelengths. Below-the-bandgap high-order harmonics generated by ultrashort mid-infrared laser pulses are shown to be ideally suited to probe the nonlinearities of electron bands, enabling an all-optical mapping of the electron band structure in bulk solids. This lecture will provide an overview of exciting new physics behind the recent achievements in this rapidly growing area of ultrafast optical science.

PMA3 • 15:00-16:00 • PLENARY
New frontiers in quantum optomechanics, M. Aspelmeyer, *Univ. of Vienna, Austria.* The quantum optical control of solid-state mechanical devices, quantum optomechanics, has emerged as a new frontier of light-matter interactions. Devices currently under investigation cover a mass range of more than 15 orders of magnitude - from nanomechanical waveguides of some picograms to macroscopic, kilogram-weight mirrors of gravitational wave detectors. This development has been enabled by the insight that quantum optics provides a powerful toolbox to generate, manipulate and detect quantum states of mechanical motion, in particular by coupling the mechanics to an optical or microwave cavity field. Originally, such cavity optomechanical systems have been studied from the early 1970s on in the context of gravitational wave antennas beginning with the pioneering works by Braginsky. Advancements in micro-fabrication and micro-cavities, however, have resulted in the development of a completely new generation of nano- and micro-optomechanical devices. Today, 10 years after the first demonstrations of laser cooling of micromechanical resonators, the quantum regime of nano- and micromechanical motion is firmly established. Recent experimental achievements include the generation of genuinely non-classical states of micromechanical motion such as quantum squeezing and entanglement. This level of control over solid-state mechanical degrees of freedom is now also being utilized in diverse application domains ranging from classical sensing, to low-noise optical coatings for precision interferometry, and also to photon-phonon quantum interfaces.
From the fundamental physics point of view, one of the fascinating prospects of quantum optomechanics is to coherently control the motional degree of freedom of a massive object in an unprecedented parameter regime of large mass and long coherence time, hence opening up a new avenue for macroscopic quantum experiments. The availability of quantum superposition states involving increasingly massive objects could enable a completely new class of experiments, in which the source mass character of the quantum system starts to play a role. This addresses directly one of the outstanding questions at the interface between quantum physics and gravity, namely “how does a quantum system gravitate?”

Monday, September 26, 2016

Hall 1 ICONO-01/2	Hall 2 ICONO-06/1	Hall 3 ICONO-02/2
16:30–18:30 IMD • Quantum and Atom Optics II (ICONO-01/2) Andrei Klimov, *Univ. de Guadalajara, Mexico, Chair*	16:30–18:30 IME ● Diamond and Silicon Carbid Based Quantum Information Technologies I (ICONO-06/1) Christian Degen, *ETH Zurich, Switzerland, Chair*	16:30-18:30 IMF ● Quantum Information Science, Engineering, and Technologies II (ICONO-02/2) Claude Fabre, *Laboratory Kastler Brossel, Univ. Pierre et Marie Curie, Sorbonne Univ. Paris, France, Chair*
IMD1 • 16:30-17:00 • INVITED ***Near-field interference in a chain of fluctuating Bose condensates,*** A. Turlapov, *Inst. of Applied Physics, RAS, Russia.* Interference in a long chain of Bose condensates is observed. Spatially quasi-periodic interference pattern appears even for uncorrelated condensate phases. However, the fringe period depends qualitatively on whether the adjacent condensates are in phase.	IME1 • 16:30-17:15 • KEYNOTE To be announced, J. Warchrup, *Univ. Stuttgart, Germany.*	IMF1 • 16:30-17:00 • INVITED ***Photonic wheels and transverse spin of light,*** G. Leuchs, P. Banzer, *Max Planck Inst. for the Science of Light, Germany.* Spatial confinement of light gives rise to the appearance of longitudinal field components, exhibiting a universal phase relation with respect to their transverse counterparts. Consequently, nonzero transverse components of the field's spin density are observed.
IMD2 • 17:00-17:30 • INVITED ***Forster resonances between ultracold atoms for quantum information,*** I. I. Beterov, M. Saffman, D. B. Tretyakov, V.M. Entin, E. A. Yakshina, S. Bergamini, E.A. Kuznetsova, C. Andreeva, and I. I. Ryabtsev, *Rzhanov Inst. of Semiconductor Physics, SB RAS, Novosibirsk State Univ., Russia.* Stark-tuned Förster resonances between Rydberg atoms are advantageous for quantum information with neutral atoms. We propose schemes of two-qubit gates and report the experimental observation of the Förster resonances in a time-varying electric field.		IMF2 • 17:00-17:30 • INVITED ***Entanglement decay of twisted photons in a turbulent atmosphere,*** V.N. Shatokhin, *Albert-Ludwigs Univ. of Freiburg, Germany.* We study the propagation of two photonic qubits, initially maximally entangled in their orbital angular momenta (OAM), across a turbulent atmosphere and explore how entanglement decay depends on the OAM and on the turbulence strength.

Hall 4 LAT-02/2	Hall 5 LAT-01/2	
16:30–18:00 LMC • Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/2) Alexei Malinka, *B.I.Stepanov Inst. of Physics of NASB, Belarus, Chair*	16:30–18:30 LMD • Laser System and Materials II (LAT-01/2) Igor Bufetov, *Fiber Optics Research Center of RAS, Russia, Chair*	
LMC1 • 16:30-17:00 • INVITED *Remote Sensing of Arctic Fjords and freshwater reservoir by Raman Lidar,* S. M. Pershin, A. F. Bunkin, M.Ya. Grishin, V.K.Klinkov, V. N. Lednev, E. G. Morozov, A.V. Marchenko, S.A. Ermakov, I.A. Kapustin6 and A.A. Molkov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The formation of an immiscible layer of relict thaw water from the glacier on the sea surface that screens of fjord water heat was discovered by lidar monitoring the Paulabreen glacier (arch. Svalbard).	LMD1 • 16:30-17:00 • INVITED *Mid-Infrared Femtosecond Solid-state and Fiber Laser Systems for Real-world Applications,* N. Tolstik, E. Sorokin, I.T. Sorokina, *NTNU Norwegian Univ. of Science and Technology, Norway.* Recent progress in mid-infrared femtosecond solid-state and fiber lasers is reported. Last achievements include multi-watt output power, tens of nJ pulse energy, 20 MHz to 1 GHz repetition rate, and 30 to 200 fs pulse durations.	
	LMD2 • 17:00-17:30 • INVITED *A sub-picosecond Ho laser and its application as a driver for mid-IR parametric amplification,* P. Malevich, T. Kanai, S. S. Kangaparambil, H. Hoogland, R. Holzwarth, A. Pugžlys, A. Baltuška, *Photonics Inst. of Vienna Univ. of Technology, Austria.* We present a hybrid KTA / ZGP mid-infrared optical parametric amplifier, driven by a sub-ps multi-millijoule kilohertz 2.09-μm Ho:YAG chirped pulse amplifier.	

Hall 1 ICONO-01/2	Hall 2 ICONO-06/1	Hall 3 ICONO-02/3
16:30–18:30 IMD • Quantum and Atom Optics II (ICONO-01/2)—Continued	16:30–18:30 IME ● Diamond and Silicon Carbid Based Quantum Information Technologies I (ICONO-06/1)—Continued	16:30-18:30 IMF ● Quantum Information Science, Engineering, and Technologies II (ICONO-02/2)—Continued
	IME2 • 17:15-17:45 • INVITED *Robust quantum gate operations for hybrid spin-qubits,* D. Suter, *TU Dortmund, Germany.* Combining different types of qubits, such as nuclear and electronic spins in diamond, provides additional resources for the implementation of quantum information processing. Protecting the information in these qubits from external perturbations can be achieved by suitably adapted control operations.	
IMD3 • 17:30-18:00 • INVITED *Single atom and nanohole: Effective photon transport,* A.E. Afanasiev, P.N. Melentiev, A.A. Kuzin, A.Yu. Kalatskiy, V.I. Balykin, *Inst. of Spectroscopy, RAS, Russia.* We have proposed and investigated for the first time an efficient way of a photon transport through a subwavelength hole due to its absorption by a moving atom.		IMF3 • 17:30-18:00 • INVITED *Raman echo quantum memory schemes in optical cavity,* S.A. Moiseev and E.S. Moiseev, *Kazan National Research Technical Univ., Russia.* New schemes of photon echo quantum memory based on the off-resonant interaction with atomic system in resonant cavity are studied. We elaborate particular schemes providing broadband and multi-mode storage of signal fields on atoms in optical cavity. Also we discuss using of these schemes for efficient manipulations and frequency transformation of single photon fields.
	IME3 • 17:45-18:15 • INVITED *Spin on a fiber: Quantum sensing on a fiber platform,* I.V. Fedotov, S. Blakley, A.A. Lanin, E.E. Serebryannikov, L.V. Doronina-Amitonova, N.A. Safronov, J. Becker, Y.G. Ermakova, D.A. Sidorov-Biryukov, V.V. Belousov, A.B. Fedotov, S.Ya. Kilin, K. Sakoda, P. Hemmer, V.L. Velichansky, M.O. Scully, and A.M. Zheltikov, *Lomonosov Moscow State Univ., Russia.* Integration of nitrogen–vacancy diamond photonics with advanced fiber-optic technologies provides a versatile fiber-optic platform for quantum sensing, offering unique solutions for optical magnetometry, biophotonics, and neuroscience.	

Hall 4 LAT-02/2	Hall 5 LAT-01/2	
16:30–18:00 LMC • Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/2)—Continued	16:30–18:30 LMD • Laser System and Materials II (LAT-01/2)—Continued	
LMC2 • 17:30-17:45 • ORAL *Temperature Dependent Line Broadening of the Liquid Water Raman Bands in Remote Sensing: Multimode Brownian Oscillator Model,* R. Yu. Pishchalnikov, S. M. Pershin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Spectral density of the intermolecular and intramolecular degrees of freedom in the liquid state has been calculated in terms of a multimode Brownian oscillator model. Making a numerical fit of the Raman bands detected by a compact lidar, we have estimated the intensity of a coupling between nuclear degrees of freedom and the medium which gives us important information about a level of inhomogeneity of the hydrogen bonding network.	LMD3 • 17:30-17:45 • ORAL *Pulsed Diode-Pumped Picosecond Lasers with the Dynamical Operation Control,* N.G. Mikheev, V.B. Morozov, A.N. Olenin, I.V. Tulin, D.I. Ustinov, D.V. Yakovlev, *International Laser Centre & Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Pulsed-diode-pumped high-peak-power picosecond Nd:YAG and Nd:YLF lasers have been developed. The schemes operate at repetition rate up to 400 Hz and provide output radiation with single picosecond pulse energy up to 3 mJ. Theoretical modeling adequately describing evolution of time pulse profile is presented.	
LMC3 • 17:45-18:00 • ORAL *Prototype Of Laser Gas Analyzer Of DIAL Technique For Track Measurements In Urban Conditions On The Basis Of Ce:LiCaAlF6 Laser,* A. S. Nizamutdinov, M. S. Zuev, V. V. Semashko, *Kazan Federal Univ., Russian Federation.* A prototype of DIAL laser gas analyzer on the basis of tunable Ce:LiCaAlF6 laser is discussed. The measured detection threshold appeared to be 2,52·10-6 g/m3 for NO2, 0,30·10-6 g/m3 for SO2, 0,03·10-6 g/m3 for O3.	LMD4 • 17:45-18:00 • ORAL *Broadband Mid-Infrared Gas Laser Systems,* A.A. Kotkov, O.V. Budilova, A.A. Ionin, I.O. Kinyaevskiy, Yu.M. Klimachev, A.Yu. Kozlov, *P.N. Lebedev Physical Inst. of RAS, Russian Federation.* Mid-infrared laser systems consisting of CO and CO2 lasers with solid-state frequency converter were developed. The laser systems can emit within broadband wavelength range from 2.5 to 16.6 microns (2.7 octave).	

Hall 1 ICONO-01/2

16:30–18:30
IMD • Quantum and Atom Optics II (ICONO-01/2)—Continued

IMD4 • 18:00-18:15 • ORAL
Trapping and Doppler cooling of Mg+ ions in a linear Paul trap, I. V. Zalivako, I. A. Semerikov, A. S. Borisenko, T. V. Shpakovsky, V. N. Sorokin, K. Yu. Khabarova, N. N. Kolachevsky, *P.N. Lebedev Physical Inst., RAS, Russia.* We set up a linear Paul trap for simultaneous trapping of Mg^+ and Al^+ ions trap. Losses mechanisms of the hot ions from the trap are studied experimentally and theoretically. Doppler cooling of Mg^+ ions in the trap is demonstrated using 280 nm radiation.

IMD5 • 18:15-18:30 • ORAL
Oscillon-like patterns in atomic Bose-Einstein condensates confined in optical lattices, A. P. Alodjants, E. S. Sedov, M. V. Charukhchyan, S. M. Arakelian, *Vladimir State Univ., Russia.* The problem of formation of small-amplitude spatial patterns in atomic Bose-Einstein condensates confined in two- and three-dimensional lattice potentials has been considered. We have demonstrated that manipulation by dispersion characteristics of atomic wave packets leads to effective hyperbolic dispersion and the atomic system can be described by the nonlinear Klein-Gordon equation. The obtained results mimics some analogues of fundamental cosmological processes occurring during our Universe's evolution and nonlinear metamaterials with hyperbolic dispersion.

Hall 2 ICONO-06/1

16:30–18:30
IME ● Diamond and Silicon Carbid Based Quantum Information Technologies I (ICONO-06/1)—Continued

IME4 • 18:15-18:30 • ORAL
Engineered microwaves to manipulate ^{13}C nuclear spins in hyperfine-coupled NV-^{13}C complexes in diamond, A.P. Nizovtsev, S.Ya. Kilin, *Stepanov Inst. of Physics, NASB, Belarus.* We study the transient microwave-induced dynamics of a NV-^{13}C spin system in diamond and show that one can effectively manipulates the nuclear states using pulsed MWs with characteristics optimized to implement resonances in the "MW-dressed" spin system

Hall 3 ICONO-02/3

16:30-18:30
IMF ● Quantum Information Science, Engineering, and Technologies II (ICONO-02/2)—Continued

IMF4 • 18:00-18:15 • ORAL
Quasi-one-dimensional channel for light-atoms quantum interface, A.S. Sheremet, L.V. Gerasimov, V.A. Pivovarov, D.V. Kupriyanov, *St.-Petersburg State Polytechnic Univ., Russia.* We show how the quantum interface between light and atomic subsystems can be organized for light transporting through an array of cold atoms via dielectric nanofiber.

IMF5 • 18:15-18:30 • ORAL
A loophole-free test of Bell's inequality with atoms entangled over a distance of 400 m, W. Rosenfeld, D. Burchardt, K. Redeker, R. Garthoff, N. Ortegel, M. Rau, H. Weinfurter, *Faculty of Physics, LMU, Germany.* We show a loophole-free violation of Bell's inequality by performing efficient and space-like separated measurements on single neutral atoms separated by 400 m. The results 2.237 ± 0.047 and 2.202 ± 0.047 provide a strong evidence against local realism.

Hall 4 LAT-02/2	Hall 5 LAT-01/2	
16:30–18:30 LMC • Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/2)—Continued	16:30–18:30 LMD • Laser System and Materials II (LAT-01/2)—Continued LMD5 • 18:00-18:15 • ORAL *Long-Wavelength Carbon Monoxide Laser on the Highest Vibrational Transitions,* A.A. Kotkov, O.V. Budilova, A.A. Ionin, I.O. Kinyaevskiy, Yu.M. Klimachev and A.Yu. Kozlov, *P.N. Lebedev Physical Inst. of RAS, Russia.* Carbon monoxide laser emitting on the highest ever observed vibrational transition 39=>38 with wavelength up to 8.7 micron was for the first time launched. Influence of gas mixture content on CO laser spectrum is discussed. LMD6 • 18:15-18:30 • ORAL *Silicon Based Modulator for Optical Control of Wide Band Terahertz Radiation,* G.V. Sinitsyn, A.V. Lyakhnovich, V.L. Malevich, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* We present optically controlled wide band terahertz modulator based on frustrated total internal reflection effect induced by electron-hole plasma optically excited at the surface of high resistivity silicon lens. The modulator is experimentally tested and high modulation efficiency is demonstrated.	

Hall 1
ICONO-01/3

09:00-11:00
ITuA ● Quantum and Atom Optics III (ICONO-01/3)
Ivan Sokolov, *Saint Petersburg State Univ., Russia, Chair*

ITuA1 • 09:00-09:30 • INVITED
Non-destructive interrogation of quantum phase diagrams and game-based quantum optimization, J.F. Sherson, *Aarhus Univ., Denmark.* Quantum non-demolition (QND) measurements using the dispersive light-matter interaction have over the past decade been used extensively for the realization of squeezing, entanglement, and various quantum information protocols. Currently, the challenge lies in the extension to the probing and control of interacting and strongly correlated atomic systems. I will discuss our experimental work QND probing of ultra-cold atoms. We have recently realized probing of a single cloud up to 2,000 times, feedback control of the total number of atoms, and single shot probing the quantum phase transition to a BEC. In the latter, we demonstrate QND probing as a successful tool for enhancing the sensitivity of quantum simulations experiments. In addition, I will our recent work on developing online games in which normal players contribute to solving quantum research challenges related to the development of a quantum computer. The games at www.scienceathome.org have been played by more than 150,000 people analyses of the more than 5 mio players trajectories demonstrate that large fraction of the players outperform state-of-the-art optimization algorithms.

ITuA2 • 09:30-10:00 • INVITED
A magnetic source imaging camera (MSIC) based on atomic magnetometry, S. Colombo, V. Dolgovskiy, I. Fescenko, V. Lebedev, A. Weis, J. Zhang, *Physics Department Univ. of Fribourg, Switzerland.* We describe a magnetic source imaging camera allowing two-dimensional visualizations of a specific magnetic field component's amplitude in a region of 20×20 mm2. The device is used to map the magnetic field of magnetized nanoparticles.

Hall 2
ICONO-06/2

09:00-11:00
ITuB ● Diamond and Silicon Carbid Based Quantum Information Technologies II (ICONO-06/2)
Vladimir Dyakonov, *Julius-Maximilian Univ. of Wuerzburg, Germany, Chair*

ITuB1 • 09:00-09:30 • INVITED
Quantum sensing with high spectral resolution, C. Degen, *ETH Zurich, Switzerland.* "Quantum sensing" describes the detection of weak signals with the help of a quantum system, like a spin qubit. An important aspect of quantum sensing – apart from measurement sensitivity – is the acquisition of time-dependent signals, and the ability to perform a spectral signal analysis. Our group is exploring quantum sensing techniques using the electronic and nuclear spins of nitrogen-vacancy centers (NV centers) in diamond. In this talk, I will present recent efforts at implementing a high-resolution spectrum analyzer with diamond NV centers. I will first introduce the basics of NV centers and show how they can be used for detecting ac magnetic fields, such as the spin noise produced by nuclear spins. I will then show examples of nuclear Fourier spectroscopy on single 13C nuclei within diamond, and small ensembles (~1e2-1e4) of proton spins on the diamond chip. Finally, I will discuss the use of a 15N nuclear quantum memory for further increasing the spectral resolution and speeding up the signal acquisition.

ITuB2 • 09:30-10:00 • INVITED
Towards light-matter interface for the NV center in diamond, A.V. Akimov, V.V. Vorobyov, V.V. Soshenko, S.V. Bolshedvorskii, J. Javadzade, N. Lebedev, A.N. Smolyaninov, V.N. Sorokin, *Texas A&M Univ., USA.* I will present our work on using CMOS-compatible hyperbolic metamaterials and optical fibers to construct efficient single photon sources and sensing elements using NV centers in diamond.

Hall 3
LAT-05/1

09:00-11:00
LTuA ● Nanomaterials for Lasers (LAT-05/1)
Elena Obraztsova, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*

LTuA1 • 09:00-09:45 • KEYNOTE
Nanocarbon materials for short pulse lasers, S. Yamashita, *Research Center for Advanced Science and Technology (RCAST), The Univ. of Tokyo.* We review the optical properties of carbon nanotubes (CNTs) and graphene, and describe how those properties have been used for the implementation of various nonlinear fiber optic applications.

Hall 4 LAT-02/3	Hall 5 LAT-01/3	Notes
09:00-11:00 LTuB ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/3) Andrei Bril, *B.I. Stepanov Inst. of Physics of NASB, Belarus, Chair*	09:00-11:00 LTuC ● Laser System and Materials III (LAT-01/3) Maxim Doroshenko, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*	
LTuB1 • 09:00-09:45 • KEYNOTE *A new generation of super compact trouble free lidar,* S. M. Pershin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Abstract. There are many types of lidar, but only some of them can be used for remote sensing in crowded places without eyes protection. Application gated quantum counters it possible to create a super compact eye-safe lidar (weighing less than a kg) for environmental monitoring.	LTuC1 • 09:00-09:30 • INVITED *Negative curvature hollow-core optical fibers for lasers,* I.A. Bufetov, A.V. Gladyshev, A.F. Kosolapov, A.D. Pryamikov, *Fiber Optics Research Center of RAS, Russia.* Various types of hollow-core microstructured optical fibers are reviewed with emphasis on fibers with negative curvature of the core-cladding boundary. Hydrogen Raman lasers based on three different types of such fibers (revolver fibers) are demonstrated.	
	LTuC2 • 09:30-10:00 • INVITED *High-Power Diode Pumped Raman Fiber Lasers Operating Below 1 Micron,* E. A. Zlobina, S. I. Kablukov, S. A. Babin, *Inst. of Automation and Electrometry SB RAS, Novosibirsk State Univ., Russia.* A brief review of recent results on LD-pumped Raman fiber lasers (RFLs) is presented. Multimode graded-index fiber directly pumped by a 915-nm LD generates ~10W low-index transverse modes at 954 nm with slope efficiency >50%.	

Hall 1 ICONO-01/3

09:00-11:00
ITuA ● Quantum and Atom Optics III (ICONO-01/3)—Continued

ITuA3 • 10:00-10:15 • ORAL
Generation of non-classical light via self-induced transparency in mercury-filled hollow core photonic crystal fibers, U. Vogl, F. Sedlmeir, N.Y. Joly, C. Marquardt, G. Leuchs, *Max-Planck-Inst. for the Science of Light, Germany.* We successfully demonstrate squeezing of nanosecond pulses via self-induced transparency in a system of mercury vapor confined in a hollow core kagomé-style fiber.

ITuA4 • 10:15-10:30 • ORAL
Estimation error for direct state tomography, A.B. Klimov, I. Sainz, *Universidad de Guadalajara, Mexico.* We show that so-called direct state quantum tomography protocol (DST) is equivalent to the reconstruction scheme based on projections into a set of non-orthogonal equidistant bases, which allows to reduce the error analysis of weak measurements to a standard treatment through the Fisher information. In frame of this approach we analyze the statistical features of DST using the Cramer-Rao lower bound and analytically estimate the minimum mean square error for arbitarry interaction strengths, showing that estimation error increases for weak measurements. In addition we compare the perfromance of the SIC-POVM and MUB tomography with DST at different interaction strengths and for higher dimensions.

Hall 2 ICONO-06/2

09:00-11:00
ITuB ● Diamond and Silicon Carbid Based Quantum Information Technologies II (ICONO-06/2)—Continued

ITuB3 • 10:00-10:30 • INVITED
Level-crossing spectroscopy of nitrogen-vacancy centers in diamond, S.V. Anishchik, K.L. Ivanov, V.G. Vins, A.P. Yelisseyev, N.N. Lukzen, N.L. Lavrik, V.A. Bagryansky, *Voevodsky Inst. of Chemical Kinetics and Combustion SB RAS, Russia.* We propose a method for measuring Level-Crossing (LC) spectra, i.e., the magnetic field dependence of the luminescence intensity, of NV^- centers in diamonds. The technique is based on modulation of the external magnetic field and signal detection with a lock-in amplifier. By using this technique a number of new lines are observed for the first time originating from the interaction of NV^- centers with different paramagnetic impurities in diamond. An efficient method for numerical calculation of LC spectra is proposed, which allows us to extract magnetic parameters of paramagnetic defects from experimental LC spectra.

Hall 3 LAT-05/1

09:00-11:00
LTuA ● Nanomaterials for Lasers (LAT-05/1)—Continued

LTuA2 • 09:45-10:30 • INVITED
s-SWNT coupling with active silicon photonic devices, N. Izard, *Laboratoire Charles Coulomb, Univ. Montpellier, France.* We report on the strong photoluminescence enhancement from carbon nanotubes integrated in silicon microring resonators under two pumping configuration: surface-illuminated pumping and collinear pumping. Extremely efficient rejection of non-resonant photoluminescence is observed.

Hall 4 LAT-02/3	Hall 5 LAT-01/3	Notes
09:00-11:00 LTuB ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/3)—Continued	09:00-11:00 LTuC ● Laser System and Materials III (LAT-01/3)—Continued	
LTuB2 • 09:45-10:00 • ORAL *Laser Induced Breakdown Spectroscopy by Picosecond Pulses Train vs Nanosecond Pulse,* V.N. Lednev, S.M. Pershin, M.N. Filippov , *National Univ. of Science and Technology MISiS, Moscow, Russia, Moscow.* A comparison of laser ablation by picosecond pulses train and nanosecond pulse revealed a difference in laser craters, ablation thresholds, plasma sizes, spectra lines intensity as well as analytical capabilities of laser induced breakdown spectroscopy.		
LTuB3 • 10:00-10:15 • ORAL *Temperature Measurement by Projection to Latent Structures of Fluorescence Spectra,* V.A. Aseev, A.N. Babkina, M.A. Khodasevich, P.S. Shirshnev, Y.A.Varaksa, *B.I. Stepanov Inst. of Physics, NAS Belarus, Belarus.* Projection to latent structures is applied to determine the temperature using fluorescence spectra of erbium-doped lead fluoride glass ceramics and potassium-alumina-borate glasses with copper-containing molecular clusters. This method allows reducing the relative error of temperature measurement in comparison with the classical ones.	LTuC3 • 10:00-10:15 • ORAL *Two-dimensional temperature and power image over the growth zone of sapphire (Al2O3) single crystal fibers,* G.A. Bufetova, S.Ya. Rusanov, V.F. Seregin, Yu.N. Pyrkov, V.B. Tsvetkov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Two-dimensional temperature and power image of sapphire single crystal molten zone being grown under CO2-laser heating is determined from thermal radiation spectra measurements in the 1000-1300 nm spectral range.	
LTuB4 • 10:15-10:30 • ORAL *Measurements of temperature and positive gain of Oxigen-Iodine laser active media,* Yu. A. Adamenkov, *RFNC-VNIIEF, Russia.* We present results of measurements of temperature and small positive gain of supersonic chemical Oxygen-Iodine laser. We used tunable external cavity diode laser at 1315nm in our experiments.	LTuC4 • 10:15-10:30 • ORAL *Mid-Infrared segmented nano grains extruded fibers based on metal halides crystals and their applications,* L.N. Butvina, A.L. Butvina, *Fiber Optics Research Center of RAS, Russia.* Fundamentally low loss (0,05 dB/m) mid-infrared (3-15 μm) micro- and nano-structured segmented, Dy+3doped, extruded fibers, based on multi component metal (Ag, K, Na) halides (Cl, Br,I) crystals, and their optical, mechanical properties and applications will be discussed.	

Hall 1
ICONO-01/3

09:00-11:00
ITuA • Quantum and Atom Optics III (ICONO-01/3)—Continued

ITuA5 • 10:30-10:45 • ORAL
Multiplicated ghost images reconstruction, D.A. Balakin, A. V. Belinsky, A. S. Chirkin, and V.S. Yakovlev, *Lomonosov Moscow State Univ., Russia.* Application of multipartite entangled quantum states of light fields makes it possible to simultaneously reconstruct several ghost images of an object. This fact is used to improve the quality of the reconstructed image by taking into account the influence of a set of factors on ghost imaging.

ITuA6 • 10:45-11:00 • ORAL
Two-mode Schrodinger cats, D. B. Horoshko, S. De Bi\`evre, M. I. Kolobov, G. Patera, *B. I. Stepanov Inst. of Physics, NASB, Belarus.* We consider a superposition of two-mode coherent states placed equidistantly on the circle in the phase space. We find an analytical expression for the Schmidt decomposition of such an entangled state, and its entanglement of formation.

Hall 2
ICONO-06/2

09:00-11:00
ITuB • Diamond and Silicon Carbid Based Quantum Information Technologies II (ICONO-06/2)—Continued

ITuB4 • 10:30-11:00 • INVITED
Fluorescent nanodiamond as an emitter of single photons, I.I. Vlasov, *General Physics Inst., Russia.* Fluorescent properties of single color centers were studied in nanodiamonds of different origin. It was found that single photon emitters could be realized even in molecular-sized diamond (less than 2 nm) capable of housing stable luminescent center "silicon-vacancy."

Hall 3
LAT-05/1

09:00-11:00
LTuA • Nanomaterials for Lasers (LAT-05/1)—Continued

LTuA3 • 10:30-11:00 • INVITED
Carbon nanotubes for application in 2um ultrafast fibre lasers, M. Chernysheva, Aston University, UK

We review application of carbon nanotubes in Mid-infrared fibre lasers as saturable absorber. We will discuss the influence of particular CNT fabrication techniques and optical properties on Mid-infrared laser generation.

Hall 4 LAT-02/3	Hall 5 LAT-01/3	Notes
09:00-11:00 LTuB ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/3)—Continued	09:00-11:00 LTuC ● Laser System and Materials III (LAT-01/3)—Continued LTuC5 • 10:30-10:45 • ORAL *Investigation of Optical Structure Based on Double Cladding Fiber with Overlays,* O.V. Ivanov, F. Yang, F. Tian, H. Du, *Ulyanovsk Branch of Kotel'nikov Inst. of Radio Engineering and Electronics of RAS, Russia.* We investigate a fiber-optic structure based on a fiber section having a depressed inner cladding and thin overlay. We measure transmission spectra of the structure upon changes in the external refractive index and overlays thickness. LTuC6 • 10:45-11:00 • ORAL *Photobleaching in Bi-Doped Germanosilicate Fibers at Different Laser Irradiation Wavelengths,* S.V. Firstov, S.V. Alyshev, E.G. Firstova, M.A. Melkumov, A.M. Hegay, V.F. Khopin, A.N. Guryanov, E.M. Dianov, *Fiber Optics Research Center of RAS, Russia.* Photobleaching in bismuth-doped high-germania silica-based optical fibers at 300 and 77 K was studied under various wavelengths and powers of laser irradiation. The valuable information regarding the nature of Bi-related active centers has been obtained.	

Hall 1
ICONO-01/4

11:30-13:15
ITuC ● Quantum and Atom Optics IV (ICONO-01/4)
Dmitri Horoshko, *B. I. Stepanov Inst. of Physics, NASB, Belarus, Chair*

ITuC1 • 11:30-12:00 • INVITED
Purcell-enhanced single-photon emission from colour centers in diamond coupled to a tunable microcavity, D. Hunger, H. Kaupp, J. Benedikter, T. Hümmer, H. Fedder, H.C. Chang, R. Albrecht, E. Neu, C. Becher, T. W. Hänsch, *Ludwig-Maximilians Univ. of Munich, Germany.* We use a fully tunable microcavity to demonstrate the control of spontaneous emission from nitrogen-vacancy and silicon-vacancy centers in diamond. This allows us to realize efficient and narrow-band single photon sources under ambient conditions.

ITuC2 • 12:00-12:15 • ORAL
Coherent control of spectral properties and mode structure of bright squeezed vacuum states of light, O. V. Tikhonova, P. R. Sharapova, M. V. Chekhova, A. Perez, S. Lemieux, R. Boyd, G. Leuchs, *Lomonosov Moscow State Univ., Russia.* Spectral properties of bright squeezed vacuum (BSV) light are investigated. Fully analytical approach is developed to describe the mode structure and frequency correlations of BSV. The obtained theoretical results are in a good agreement with performed experiments. Methods to control spectral features of BSV are suggested.

Hall 2
ICONO-06/3

11:30-13:30
ITuD ● Diamond and Silicon Carbid Based Quantum Information Technologies III (ICONO-06/3)
Igor Vlasov, *General Physics Inst., Russia, Chair*

ITuD1 • 11:30-12:00 • INVITED
Quantum optics with silicon-vacancy color centers in diamond, D. D. Sukachev, A. Sipahigil, R. E. Evans, M. J. Burek, J. Borregaard, M. K. Bhaskar, C. T. Nguyen, J. L. Pacheco, H. Atikian, R. M. Camacho, F. Jelezko, E. Bielejec, H. Park, M. Loncar, M. D. Lukin, *Harvard Univ., Cambridge, P.N.Lebedev Physical Inst., RAS, USA.* Efficient interfaces between photons and quantum emitters form the basis for quantum networks and enable nonlinear optical devices operating at the single-photon level. We demonstrate an integrated platform for scalable quantum nanophotonics based on silicon-vacancy (SiV) color centers coupled to nanoscale diamond devices. By placing SiV centers inside diamond photonic crystal cavities, we realize a quantum optical switch controlled by a single color center. We show that the switch can be activated using SiV metastable orbital states and verify optical switching at the single-photon level by using photon correlation measurements. We use Raman transitions to realize a single-photon source with tunable frequency and bandwidth in a diamond waveguide. We create entanglement between two separated SiV centers by detecting indistinguishable Raman photons emitted into a single waveguide. Entanglement is verified using a novel superradiant feature observed in photon correlation measurements. Finally, we will discuss recent experiments with Germanium-Vacancy color centers in diamond waveguides.

ITuD2 • 12:00-12:15 • ORAL
All-optical ultrafast coherent control of single silicon vacancy color centers in diamond, J. N. Becker, J. Görlitz, C. Arend, M. Markham, and C. Becher, *Universität des Saarlandes, Germany.* We report on all-optical coherent control of single silicon vacancy centers in diamond using ultrafast laser pulses. Single qubit operations are demonstrated by Rabi oscillations and Ramsey interference both on a direct transition and in a Lambda-system.

Hall 3
LAT-05/2

11:30-13:00
LTuD ● Nanomaterials for Lasers (LAT-05/2)
Shinji Yamashita, *Research Center for Advanced Science and Technology (RCAST), The Univ. of Tokyo, Japan, Chair*

LTuD1 • 11:30-12:00 • INVITED
Design considerations in the fabrication of nano-carbon saturable absorbers, A. Martinez, *Aston Inst. of Photonic Technologies, Aston Univ., United Kingdom.* We review the various available nanomaterial-based saturable absorber designs, discussing in particular, requirements of specific regimes in terms of their insertion losses, polarization properties, strength of nonlinear interaction and long term stability.

LTuD2 • 12:00-12:30 • INVITED
Laser active regions based on CdZnSe/ZnSe QDs and GaN/AlGaN submonolayers for yellow-green and ultraviolet spectral ranges, E.V. Lutsenko, G.P. Yablonskii, S.V. Sorokin, V.N. Jmerik, S.V. Ivanov, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Internal laser characteristics of heterostructures with CdZnSe/ZnSe QD active regions emitting in the yellow-green region were determined. The values of QDs material gain are discussed. Low threshold TE polarized stimulated emission was obtained in GaN submonolayer active regions in spectral range of 250-310 nm.

Hall 4 LAT-02/4	Hall 5 LAT-01/4	Notes
11:30-13:30 LTuE ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/4) Mikhalevich Vladislav, Ponurovskiy Iakov Iakovlevich, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*	11:30-13:00 LTuF ● Laser System and Materials IV (LAT-01/4) Christian Kränkel, *Universität Hamburg / Institut für Laser-Physik, Germany, Chair*	
LTuE1 • 11:30-12:00 • INVITED *The development of tunable diode laser spectroscopy in gas analysis and high resolution spectroscopy,* I. Ponurovskiy, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The report describes the DL gas analyzers made in the A.M. Prokhorov General Physics Inst. of RAS last years, also considers new methods of measurements the concentration of molecules in different buffer gases including air and estimation of isotopic composition for various molecules in the near and mid IR range.	LTuF1 • 11:30-12:00 • INVITED *Spectroscopy and Highly Efficient Lasing in Tm-doped Waveguides,* M. Pollnau, K. van Dalfsen, P. Loiko, *KTH – Royal Inst. of Technology, Sweden.* This paper reviews our recent work on the spectroscopy, optical gain, and lasing in Tm-doped waveguides in amorphous aluminum oxide and monoclinic potassium double tungstates. Particularly, the influence of the well-known cross-relaxation process is quantified.	
LTuE2 • 12:00-12:15 • ORAL *Diode laser spectroscopy of trace gases in atmosphere with external resonator,* I.V. Nikolaev, V.N. Ochkin, S.N. Tskhai, *P.N. Lebedev Physical Inst. RAS, Russia.* Some schemes of registration applied to diode laser spectroscopy with external optical resonator are discussed. Examples of measurements of small gas species in atmosphere are presented.	LTuF2 • 12:00-12:15 • ORAL *Random lasing of white light in mixture of ZnCdSSe powders,* M. S. Leanenia, E. V. Lutsenko, E. V. Muravitskaya, D. I. Babuskin, A. Y. Alyamani, L. M. Alanazi, G. P. Yablonskii, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Random lasing of white light was achieved in a system of closely packed ZnCdSSe crystallites. Lasing simultaneously at 460 nm, 520 nm, 580 nm and 660 nm with threshold of 0.8 MW/cm2 is due to an appearance of random feedback for amplified radiation in every system of active scattering crystallites forming in sum the white light emission spectrum	

Hall 1
ICONO-01/4

11:30-13:15
ITuC ● Quantum and Atom Optics IV
(ICONO-01/4)—Continued

ITuC3 • 12:15-12:30 • ORAL
Coherent control of atomic q-bits by non-classical light, S.N. Balybin, O.V. Tikhonova, *Department of Physics, Lomonosov Moscow State Univ., Russia.* The interaction of an atomic q-bit with non-classical light is investigated and a method to transfer the phase from the superposition of quantum photon states to atomic q-bit is suggested. A simple way to measure the value of the transferred phase is demonstrated. The possibility of tomography of an unknown atomic state is discussed.

ITuC4 • 12:30-12:45 • ORAL
Synthetic frequency protocol in the Ramsey spectroscopy of clock transitions, V. I. Yudin, A. V. Taichenachev, M. Yu. Basalaev, T. Zanon-Willette, *Novosibirsk State Univ., Russia.* We develop an universal method to significantly suppress probe-induced shifts in any types of atomic clocks using the Ramsey spectroscopy. The frequency shifts can be suppressed considerably below a fractional level of 10^{-18} practically for any optical atomic clocks.

ITuC5 • 12:45-13:00 • ORAL
Momentum distributions of cold atoms in standing wave: Quantum regimes, R.Y. Ilenkov, O.N. Prudnikov, A.V. Taichenachev, V.I. Yudin, *Inst. of Laser Physics SB RAS, Russia.* Scientific task is investigation of two-level atoms laser cooling. Exact quantum calculation method with taking into full account recoil effects was developed. Bimodal momentum distribution of atoms allow to gain significant number of atoms below Doppler limit.

Hall 2
ICONO-06/3

11:30-13:30
ITuD ● Diamond and Silicon Carbid Based Quantum Information Technologies III (ICONO-06/3)—Continued

ITuD3 • 12:15-12:45 • INVITED
The rise of silicon carbide as a promisimg integrated quantum nanophotonics platform, S. Castelletto, *Australia.*

ITuD4 • 12:45-13:15 • INVITED
Intrinsic defects in SiC for spin-based quantum applications, V. Dyakonov, V. A. Soltamov, P. G. Baranov, H. Kraus, A. Sperlich, T. Ohshima, G. V. Astakhov, *Julius-Maximilian Univ. of Wuerzburg, Germany.* Atomic-scale defects in silicon carbide usually limit the performance of this material in high-power electronics and radio-frequency communication. Here, we reveal a family of silicon vacancy-related defects in SiC exhibiting attractive spin properties. In particular, the defect spins can be coherently manipulated at room temperature by means of optically-detected magnetic resonance (ODMR), suggesting appealing quantum applications. The optically- induced population inversion of these high-spin ground states leads to stimulated microwave emission, which we directly observed in our silicon carbide crystals. The analysis based on the experimentally obtained parameters shows that this property can be used to implement solid- state masers and radio-frequency amplifiers.

Hall 3
LAT-05/2

11:30-13:00
LTuD ● Nanomaterials for Lasers
(LAT-05/2)—Continued

LTuD3 • 12:30-13:00 • INVITED
Light-induced anisotropy of the glass-metal nanocomposites under irradiation with femtosecond laser pulses, M. Halonen, A. A. Lipovsky and Yu. P. Svirko, *Univ. of Eastern Finland, Finland.* We report a femtosecond laser shaping of silver nanoparticles embedded in soda-lime glass via the fast excitation of the electronic system of metal followed by the electron and ion emission into glass matrix.

Hall 4 LAT-02/4	Hall 5 LAT-01/4	Notes
11:30-13:30 LTuE ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/4)—Continued	11:30-13:00 LTuF ● Laser System and Materials IV (LAT-01/4)—Continued	
LTuE3 • 12:15-12:30 • ORAL *Measurement of pressure broadening coefficient of the Ar absorption line at 811.5 nm with a diode laser,* A.R. Ghildina, P.A. Mikheyev, A.K. Chernyshov, N.I. Ufimtsev, V.N. Azyazov, M.C. Heaven, *Samara National Research Univ., Russian Federation.* In this paper the new results of measurements of pressure broadening coefficient for argon 811.5 nm line by neon, using the tunable diode laser spectroscopy, are presented. The obtained value is ξAr-Ne = (1.1±0.2)×10-10 s-1cm3.	LTuF3 • 12:15-12:30 • ORAL *Wave processes in four-layered planar structure with nonlinear anisotropic-gradient media in case of falling of an optical beam with nongaussian complex structure.,* I.P. Rudenok, A.I. Kireeva, A.P. Pozdnyakov, *Volgograd State Technical Univ., Southern Federal District.* The wave processes in structures with inner nonlinear anisotropic-gradient medium in the case of falling of optical non-Gaussian beams were investigated. We received and solved a non-linear wave equation to the cross-sectional components.	
LTuE4 • 12:30-12:45 • ORAL *Photoacoustic gas sensors based on tunable diode lasers,* A.L. Ulasevich, A.A. Kouzmouk, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* A new type of photoacoustic gas sensors is presented. Sensor contains near-infrared single-mode semiconductor laser and small resonant photoacoustic cell. Detection sensitivity of the sensors for absorption coefficient is 10-7 cm-1. Volume of gas sample does not exceed 0.5 cm3.	LTuF4 • 12:30-12:45 • ORAL *Scattering by Polymer-Dispersed Liquid Crystal Films,* V. A. Loiko, V. Ya. Zyryanov, A. A. Miskevich, A. V. Konkolovich, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Scattering and transmittance of films containing liquid crystal droplets with homogeneous and inhomo-geneous adhesion on the interface polymer-liquid crystal is investigated by the anomalous diffraction and interference approximations. Point asymmetry in angular pattern is discussed.	
	LTuF5 • 12:45-13:00 • ORAL *Time-Resolved Spectroscopy of Light-induced Refraction in Laser Materials: the Latest Results,* E.V. Ivakin, I.G. Kisialiou, G.E. Malashkevich, O.L. Antipov, V.N. Sigaev, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The results of our investigation of new laser materials by the transient grating method are given. Some parameters of the materials infecting the generating properties of lasers are determined via kinetic and amplitude characteristics of the diffraction signals recorded.	

Hall 1 ICONO-01/4	Hall 2 ICONO-06/3	Hall 3 LAT-05/2
11:30-13:15 ITuC ● Quantum and Atom Optics IV (ICONO-01/4)—Continued	11:30-13:30 ITuD ● Diamond and Silicon Carbid Based Quantum Information Technologies III (ICONO-06/3)—Continued	11:30-13:00 LTuD ● Nanomaterials for Lasers (LAT-05/2)—Continued
ITuC6 • 13:00-13:15 • ORAL ***Weak local cross-Kerr nonlinearity and linear optical "elimination" measurements as a resource for quantum state engineering,*** A.B. Mikhalychev, I.L. Karuseichyk, S.Ya. Kilin, *B. I. Stepanov Inst. of Physics, NASB, Belarus.* Operator description of linear optical scheme of "elimination" measurements is provided. Applications of such measurements, accompanied by cross-Kerr interaction, to several problems of quantum state engineering are discussed.	ITuD5 • 13:15-13:30 • ORAL ***All-optical magnetometry with defects in silicon carbide,*** G. V. Astakhov, D. Simin, V. A. Soltamov, A. V. Poshakinskiy, A. N. Anisimov, R. A. Babunts, D. O. Tolmachev, E. N. Mokhov, M. Trupke, S. A. Tarasenko, A. Sperlich, P. G. Baranov, V. Dyakonov, *Julius-Maximilian Univ. of Wuerzburg, Germany.* We observe a sharp variation of the photoluminescence intensity in the vicinity of the forbidden level anticrossing, which can be used for a purely all-optical sensing of the magnetic field with nanotesla resolution.	

Hall 4 LAT-02/4	Hall 5 LAT-01/4	Notes
11:30-13:30 LTuE ● Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02/4)—Continued	11:30-13:00 LTuF ● Laser System and Materials IV (LAT-01/4)—Continued	

Hall 1
ICONO-05/1

14:30-16:00
ITuE ● Nonlinear Space-Time Dynamics, Instabilities, and Patterns I (ICONO-05/1)
Nikolay Rosanov, *Vavilov State Optical Inst., Russia, Chair*

ITuE1 • 14:30-15:00 • INVITED
Front dynamics and phase solitons in laser with coherent forcing, Stephane Barland, *Institut Non-Lineaire de Nice, France, France.* Different kinds of dissipative solitons have been observed in many optical systems includings mode-locked lasers, fiber cavities or semiconductor microresonators. In most cases they can be conceptually analyzed in the framework of the cubic-quintic Ginzburg-Landau equation (for systems with phase symmetry) or of the Lugiato-Lefever model (for systems with coherent forcing). Here we show that a new kind of chirally charged dissipative solitons can form when a laser (ie an oscillatory system) submitted to coherent forcing undergoes a commensurate-incommensurate transition. We discuss how the non-instantaneous material dynamics breaks the parity symmetry of propagative optical systems, impacting both interaction and chiral charge of dissipative solitons.

ITuE2 • 15:00-15:30 • INVITED
Properties of optical chaos from a laser diode with phase-conjugate feedback, E. Mercier, D. Wolfersberger, D. Rontani, M. Sciamanna, *LMOPS, CentraleSupélec, Université de Paris-Saclay & Université de Lorraine, France*. We demonstrate that the chaos generated by phase-conjugate feedback in a laser diode shows better performances and higher complexity than the one obtained from conventional optical feedback.

Hall 2
ICONO-07/1

14:30-16:15
ITuF ● Beyond Non-Linear Optics: High & Extreme Optical Field Physics I (ICONO-07/1)
Andrei Savel'ev, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia, Chair*

ITuF1 • 14:30-15:15 • KEYNOTE
Beyond relativistic laser matter interactions – Quantum processes in strong classical potentials, B. M. Hegelich, L. Labun, *Univ. of Texas at Austin, USA.* When laser fields becomes strong enough, quantum effects have to be taken into account. We are developing an effective field theory for quantum effects in strong classical potentials as well as for the first time the experimental capability to test the theory.

Hall 3
ICONO-04/1

14:30-16:30
ITuG ● Nonlinear Optics and Novel Phenomena I (ICONO-04/1)
Alexander Grabtchikov, *Stepanov Inst. of Physics, Belarus, Chair*

ITuG1 • 14:30-15:00 • INVITED
Femtosecond nonlinear optics in metallic and dielectric metasurfaces, A. A. Fedyanin, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* The talk surveys the results on the studies of the nonlinear-optical effects in different types of novel planar metamaterials utilizing plasmonic or Mie-type dielectric resonances.

ITuG2 • 15:00-15:15 • ORAL
Quadrature mode of non-linear photogalvanic autocorrelation of ultra-short laser pulses, Yu. N. Kulchin, R. V. Romashko, A. I. Grachev, and A. A. Kamshilin, *Inst. of Automation and Control Processes, FEB RAS, Russia.* A new – quadrature – mode (QM) of interferometric autocorrelation based on linear photogalvanic effect in non-centrosymmetric crystals is proposed. It is sown that QM-autocorrelation is immune to occasional phase drifts, light intensity variations or current saturation.

Hall 4 LAT-03/1	Hall 5 LAT-01/5	Notes

14:30-16:30
LTuG ● Ultra-Fast Diagnostics in Laser Research (LAT-03/1)
Michael Shchelev, *A.M. Prokhorov General Physics Inst., RAS,, Chair*

LTuG1 • 14:30-15:15 • KEYNOTE
Status of Novosibirsk Free Electron Lasers and Their Applications to Study of Fast Processes, G. Kulipanov, E. Chesnokov, Ya. Getmanov, V. Kubarev, O. Shevchenko, A. Vasiliev, N. Vinokurov., *G. I. Budker Inst. of Nuclear Physics of SB RAS, Russian Federation.* A description and parameters of free electron lasers, based of the four-track energy recovery linac, are given. The results on investigations of rapid processes are presented. The prospects of further work are discussed.

14:30-16:30
LTuH ● Laser System and Materials V (LAT-01/5)
Sergey Babin, *Inst. of Automation and Electrometry SB RAS, Novosibirsk State Univ., Russia, Chair*

LTuH1 • 14:30-15:00 • INVITED
Yb-Doped Crystals For Ultrafast Lasers And Chirped-Pulse Regenerative Amplifiers, V. Kisel, A. Rudenkov, N. Kuleshov, *Center for Optical Materials and Technologies, Belarusian National Technical Univ., Belarus.* The results of comparative study of Yb3+ doped KY(WO4)2 (KG(WO4)2), YVO4, CaYAlO4, LuAlO3 laser crystals as a gain media for femtosecond lasers and chirped-pulse regenerative amplifiers will be presented during the report

LTuH2 • 15:00-15:15 • ORAL
Lasing on huntite-like glass activated with Yb3+ ions, G. E. Malashkevich, V. V. Kouhar, E. V. Pestryakov, M. A. Merzliakov, V. N. Sigaev, N. V. Golubev, M. Z. Ziyatdinova, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The lasing effect in glasses of the composition (mol. %) 2Yb2O3-8Y2O3-30Al2O3-60B2O3 has been demonstrated for the first time. The threshold of generation in weakly selective hemispherical resonator under laser diode pumping achieves about 1.5 W.

Hall 1 ICONO-05/1

14:30-16:00
ITuE ● Nonlinear Space-Time Dynamics, Instabilities, and Patterns I (ICONO-05/1)—Continued

ITuE3 • 15:30-15:45 • ORAL
Nonlinear beats in a bistable VCSEL with near-resonant biharmonic excitation, V. N. Chizhevsky, *Stepanov Inst. of Physics, NASB, Belarus.* An effective approach for detection of weak subthreshold periodic signals in bistable systems based on the response on the frequency of nonlinear beating is experimentally demonstrated in a bistable VCSEL with near-resonant biharmonic excitation.

ITuE4 • 15:45-16:00 • ORAL
Control of spatio-temporal instabilities in class-B broad-area lasers with external optical injection, A.V. Pakhomov, *Samara Univ., Lebedev Physical Inst., Russia.* We study analytically and numerically the spatio-temporal dynamics of class-B broad-area lasers under external optical injection. It is shown, that optical injection can enable effective stabilization of spatio-temporal instabilities inherent for class-B broad-area lasers.

Hall 2 ICONO-07/1

14:30-16:15
ITuF ● Beyond Non-Linear Optics: High & Extreme Optical Field Physics I (ICONO-07/1)—Continued

ITuF2 • 15:15-15:45 • INVITED
Electron acceleration by laser pulse under its output on optical surface section "vacuum-transparent medium". Laser syncrotron, M.Yu. Romanovsky, *Federal Agency for Scietific Organization, Russia.* Relativistic electron dynamics in non-uniform electromagnetic wave of totally reflected laser pulse along the surface is studied. Strong transversal acceleration and energy gain is predicted. Parameters of laser synchrotron are presented

ITuF3 • 15:45-16:00 • ORAL
High-order optical processes: beyond perturbative nonlinear optics, V. V. Strelkov, M.A. Khokhlova, *Prokhorov General Physics Inst., Russia.* We develop an approach describing nonlinear-optical processes in strong-field domain characterized by the nonpertur-bative field-with-matter interaction. It allows deriving and analytically solving propagation equations describing high-order (HO) wave-mixing, HO parametric amplification and HO stimulated scattering.

Hall 3 ICONO-04/1

14:30-16:30
ITuG ● Nonlinear Optics and Novel Phenomena I (ICONO-04/1)—Continued

ITuG3 • 15:15-15:30 • ORAL
Interaction between weak and nonlinear optical waves in fibers in the vicinity of zero-dispersion point, I. Oreshnikov, R. Driben, A.V. Yulin, *Univ. of Paderborn, Germany.* Interaction of high intensity localized nonlinear waves with low intensity radiation can lead to significant modifications of the propagation characteristis of the nonlinear waves. Manipulation of fundamental, high, order solitons, dark solitons and other types of famous nonlinear waves can be effectively achieved by carefull choosing resonant interaction conditions.

ITuG4 • 15:30-15:45 • ORAL
Polarization interaction of singular and Gaussian light beams, D.V. Gorbach, S.A. Nazarov, A.L. Tolstik, *Belarusian State Univ., Belarus.* Coherent interaction of Gaussian and singular light beams with different polarization states has been analyzed; the possibility to control polarization of a singular wave (varying from linear to circular) due to changes in polarization of the interaction-involved waves has been demonstrated.

ITuG5 • 15:45-16:00 • ORAL
Vibrational spectra of carbon dioxide adsorbed in nanoporous glass: from partial coverage of the pore wall to condensation in the pore volume, V.G. Arakcheev, V.B. Morozov, *International Laser Centre & Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Adsorption behavior of carbon dioxide in nanoporous Vycor glass was studied by coherent anti-Stokes Raman scattering spectroscopy. The intensity and profile of the CO_2 band at 1388 cm^{-1} were measured in a wide pressure range providing the transition from partial surface coverage of the pore walls up to complete condensation in the pore volume. The contributions of the gaseous, surface-adsorbed, and liquid-like carbon dioxide have been distinguished in the spectrum even when the three states coexist. The results show that the liquid-like phase appears when the amount of the surface adsorbed fluid is below the monolayer coverage. Developed approach is applicable to characterize the fluid behavior in the pores of transparent nanoporous materials with various pore size, shape, ordering, and interconnection.

Hall 4 LAT-03/1	Hall 5 LAT-01/5	Notes
14:30-16:30 LTuG ● Ultra-Fast Diagnostics in Laser Research (LAT-03/1)—Continued	14:30-16:30 LTuH ● Laser System and Materials V (LAT-01/5)—Continued	
LTuG2 • 15:15-15:45 • INVITED *ULTRA Laser Facility Applications for Chemistry, Life Sciences and Catalysis,* I.V. Sazanovich, G.M. Greetham, I.P. Clark, I. Lezcano-González, A. M. Beale, M. Delor, J. A. Weinstein, J.P. Hall, S.J. Quinn, P.l Matousek, A.W. Parker, M. Towrie, *Central Laser Facility Research Complex at Harwell STFC Rutherford Appleton Laboratory,*. We describe ULTRA laser facility applications for chemistry, life sciences and catalysis, illustrated by vibrational control of electron transfer; photoinduced electron transfer in DNA crystals; and operando Kerr-gated Raman insight into catalytic hydrocarbon conversion with zeolites.	LTuH3 • 15:15-15:30 • ORAL *Upconversion Luminescence Of CsScF4 Crystals Doped With Erbium And Ytterbium,* D.A. Ikonnikov, V.N. Voronov, M.S. Molokeev, A.S. Aleksandrovsky, *Siberian Federal Univ., Krasnoyarskiy kray.* Bright visible upconversion luminescence with three bands of comparable intensity was observed in Er:CsScF4 and Er/Yb:CsScF4 crystals. Er/Yb occupying central inversion Sc sites under 970-980 nm pumping. Power and wavelength dependences' peculiarities are explained.	
	LTuH4 • 15:30-15:45 • ORAL *High-Efficiency Lasing and Optical Properties of Transparent Nd:YAG and Ho:YAG Ceramics,* S.M. Vatnik, I.A. Vedin, V.V. Osipov, K.E. Luk'yashin, R.N. Maksimov, V.I. Solomonov, Yu.L.Kopylov, I.Sh. Steinberg, P.E. Tverdokhleb, A.A. Pavlyuk., *Inst. of Laser Physics SB RAS, Russia.* We report on high-efficiency lasing and optical properties of YAG ceramics synthesized at IREE (Fryazino) and IEP (Ekaterinburg). The best slope efficiency is to be 36% for 1%Nd:YAG ceramics and ~ 40% for 1%Ho:YAG ceramics.	
LTuG3 • 15:45-16:15 • INVITED *High-Voltage Pico- and Nanosecond Discharge Development in Gaseous and Liquid Media,* N.L. Aleksandrov, E.M. Anokhin, I.N. Kosarev, A.Yu. Starikovskiy, *Moscow Inst. of Physics and Technology, Russian Federation.* Fast imaging study of high-voltage pulsed discharges in a wide density range is reviewed. Focus is on fast ionization waves, streamer and dielectric barrier discharges in gases and on pulsed discharges in liquids.	LTuH5 • 15:45-16:00 • ORAL *The Development of Amplification Channels of High-Intensity Laser System with 1 kHz Repetition Rate,* G.V. Kuptsov, V.V. Petrov, V.A. Petrov, A.V. Kirpichnikov, A.V. Laptev and E.V. Pestryakov, *Inst. of Laser Physics SB RAS, Russia.* The calculation of parametric amplification unit based on nonlinear borate crystals for high-intensity femtosecond laser system has been done. A gain profile with a ~20% dip near the center is proposed to optimize the amplified signal spectral shape. An all diode-pumped multipass laser amplifier was optimized to improve both short-term and long-term angular stabilities, allowing one to use the output radiation as a pump for parametric amplifier mentioned above.	

Hall 1 ICONO-05/1	Hall 2 ICONO-07/1	Hall 3 ICONO-04/1

14:30-16:15
ITuF • Beyond Non-Linear Optics: High & Extreme Optical Field Physics I (ICONO-07/1)—Continued

ITuF4 • 16:00-16:15 • ORAL
Coherent and resonant quantum electrodynamics processes in strong pulsed laser fields, S.P. Roshchupkin, *Department of Theoretical Physics, Peter the Great St. Petersburg Polytechnic Univ., Russia.* The review on coherent and resonant quantum electrodynamics processes (QED) proceeding in the strong pulsed light fields, realized in modern powerful pulsed lasers is presented.

14:30-16:30
ITuG • Nonlinear Optics and Novel Phenomena I (ICONO-04/1)—Continued

ITuG6 • 16:00-16:15 • ORAL
Narrow-band terahertz generation by femtosecond optical pulses in a LiNbO$_3$ crystal, E. A. Mashkovich, M. I. Bakunov, *Univ. of Nizhny Novgorod, Russia.* It is shown theoretically that a femtosecond optical pulse can efficiently generate narrow-band terahertz radiation in a bulk lithium niobate crystal. A phase-matched regime of the generation is provided by the anisotropic dielectric properties of the crystal.

ITuG7 • 16:15-16:30 • ORAL
Propagation and nonlinear interaction of singular light beams, O.G. Romanov, A.L. Tolstik, *Belarusian State Univ. Faculty of Physics Department of Computer Modeling, Belarus.* The evolution of spatial, topological and polarization structure of singular light beams under their propagation and nonlinear interaction in media with different types of nonlinearity has been investigated theoretically, numerically and experimentally.

Hall 4 LAT-03/1	Hall 5 LAT-01/5	Notes
14:30-16:30 LTuG ● Ultra-Fast Diagnostics in Laser Research (LAT-03/1)—Continued	14:30-16:30 LTuH ● Laser System and Materials V (LAT-01/5)—Continued	
	LTuH6 • 16:00-16:15 • ORAL *Perspectives of creating powerful solid-state optical amplifiers based on a Ce3+:LiCaAlF6 crystal,* A.I. Galiev, V.V. Semashko, O.R. Akhtyamov, M. A. Marisov, A. S. Nizamutdinov, A.A. Shavelev, *Kazan Federal Univ., Russia.* Pump-induced photodynamic processes in Ce3+:LiCaAlF6 (Ce:LiCAF) UV active media were studied by pump-probe technique. The modelling of a multipass optical amplifier testify the opportunity to design high-power UV laser system based on Ce:LiCAF media.	
LTuG4 • 16:15-16:30 • ORAL *Study of Single Femtosecond Filamentation in Gas by Transverse Interferometry Method,* P.A. Chizhov, V.V. Bukin, A.A. Ushakov, S.V. Garnov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Anisotropy of refractive index due to intense laser pulse propagation is observed. Nonlinear dependence of initial electron density in air and nitrogen on pressure is stated. Plasma decay is observed via hundreds of picoseconds.	LTuH7 • 16:15-16:30 • ORAL *Thermally Induced Beam Distortions in CaF_{2} and Other Elastically Anisotropic Crystals with Cubic Symmetry,* A. G. Vyatkin and E. A. Khazanov, *Inst. of Applied Physics of RAS, Russia.* Thermally induced beam distortions in long rods and thin disks made of cubic single crystals with anisotropic elastic properties were calculated analytically and numerically. The expressions for birefringence and arithmetic mean phase have been generalized.	

Hall 1
ICONO-05/2

17:00-18:30
ITuH ● Nonlinear Space-Time Dynamics, Instabilities, and Patterns II (ICONO-05/2)
Vyacheslav Chizhevsky, *B.I. Stepanov Inst. of Physics, National Academy of Sciences of Belarus, Belarus, Chair*

ITuH1 • 17:00-17:30 • INVITED
2D and 3D-dissipative optical solitons: Internal structure, symmetry, and motion, N. N. Rosanov, *Vavilov State Optical Inst., Russia.* For wide-aperture laser schemes with saturable absorption reviewed are the types and features of 2D- and 3D- solitons. An analysis is given of energy fluxes' topological structure and relations between their symmetry and soliton motion.

ITuH2 • 17:30-18:00 • INVITED
Soliton and topological physics with microcavity polaritons, D. Skryabin, *Department of Physics Univ. of Bath, UK.* In this talk I will review a number of results on observation of half-light half-matter solitons existing in microcavities and planar waveguides with strong exciton-photon coupling. These devices operate at the record low powers and exhibit giant levels of nonlinear response, while their response time is in the pico-second range. Technology allows to pattern these devices and create lattice and other potentials of the required geometry. Thus many condensed matter phenomena predicted and observed in real solids can be engineered in these strongly nonlinear micron scale devices. In particular, I will report our recent results on interplay of the spin-orbit coupling and nonlinear effects leading to novel topologically protected quasi-solitons in polariton topological-insulators.

Hall 2
ICONO-07/2

17:00-18:30
ITuI ● Beyond Non-Linear Optics: High & Extreme Optical Field Physics II (ICONO-07/2)
Bjorn Hegelich, *Univ. of Texas at Austin, USA, Chair*

ITuI1 • 17:00-17:30 • INVITED
Laser absorption in plasmas: from nano-targets to near-QED regime, A. Pukhov, L. Yi, D. Zhu, Z.Y. Chen, T.P.Yu, X.L.Zhu, B.Shao, B.F.Shen, Z.M.Sheng, V.Kaymak, V. Shlyaptsev, J.Rocca, *Inst. for Theoretical Physics I, Univ. of Dusseldorf, Germany.* We consider laser pulse interaction with nano- and micro-structured targets like nano-grass in the intensity range 10^{18}-10^{20} W/cm^2. At intensities higher than 10^{22} W/cm^2, the radiation damping force becomes important and can exceed the Lorentz force acting on an electron. The $\gamma-$ray emission is then the major channel of laser energy absorption.

ITuI2 • 17:30-18:00 • INVITED
Gamma production at relativistic laser interaction with sub-wavelength scale structures: Nanospheres, nanograss and other, K. Ivanov, D. Gozhev, V. Timoshenko, I. Saraeva, S. Kudryashov, E. Obraztsova, L. Borisenko, A. Orekhov, R. Volkov, A. Savel'ev, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* The effect of gamma ray and hot electron energy production growth is studied at the relativistic laser plasma interaction using various types of nanostructured solid targets.

Hall 3
ICONO-04/2

17:00-18:15
ITuJ ● Nonlinear Optics and Novel Phenomena II (ICONO-04/2)
Yuriy Kulchin, *Inst. of Automation and Control Processes, FEB RAS, Russia, Chair*

ITuJ1 • 17:00-17:30 • INVITED
Photon-avalanche-like nonlinear excitation and optical ultrafast switching in intrinsic and extrinsic crystals and nanostructures, E.Yu. Perlin, A.V. Ivanov, *ITMO Univ., Russia.* New highly efficient nonlinear two-electron mechanisms of photoexcitation and low-energy ultrafast all-optical switching of intrinsic and impurity crystals and nanostructures with deep quantum wells are presented.

ITuJ2 • 17:30-17:45 • ORAL
Nonlinear absorption in KGW and YVO4 crystals at excitation by continuous-wave laser radiation, I. A. Khodasevich, A. S. Grabtchikov, *Stepanov Inst. of Physics, Belarus.* We present experimental results on observation of nonlinear absorption in KGW and YVO4 crystals excited by continuous-wave laser radiation at 1064 nm and 970 nm. Simultaneous development of the up-conversion on rare-earth ions with the trace concentration show complicated energy transfer in crystals.

Hall 4 LAT-03/2	Hall 5 LAT-01/6	Notes
17:00-18:45 LTuI ● Ultra-Fast Diagnostics in Laser Research (LAT-03/2) Oleg Meshkov, *G. I. Budker Inst. of Nuclear Physics of SB RAS, Novosibirsk National Research state Univ., Russia, Chair*	17:00-18:30 LTuJ ● Laser System and Materials VI (LAT-01/6) Nikolai Tolstik, *NTNU Norwegian Univ. of Science and Technology, Norway, Chair*	
LTuI1 • 17:00-17:30 • INVITED ***Defects in Solid State Materials as a Result of Interaction with Charged Particles and High-Energy Photons and Their Applications for Radiation Detectors and Imaging on Nanometric Scale,*** A.P. Voitovich, R.M. Montereali, V.S. Kalinov, A.N. Novikov, L.P. Runets, A.P. Stupak, *Inst. of Physics, National Academy of Sciences, Belarus.* It is established that the peculiarities of the radiation imaging solid-state detectors can be exploited for X-ray micrograph and for observation of biological samples. It is shown that for many materials used in radiation dosimetry, nanocrystals have the larger range of linear response to dose compared with crystals of the same composition.	LTuJ1 • 17:00-17:30 • INVITED ***New trends in ultrafast diode-pumped solid-state lasers,*** T. Südmeyer, *Laboratoire Temps-Fréquence, Université de Neuchâtel, Neuchâtel.* We review latest developments in ultrafast DPSSLs, discussing topics such as power scaling, frequency comb stabilization and direct green diode pumping of femtosecond Ti:Sapphire lasers.	
LTuI2 • 17:30-18:00 • INVITED ***Electric field fast measurement in pulse discharges at elevated gas pressure,*** S.N.Tskhai, S. Yatom, Ya. E. Krasik, *P.N. Lebedev Physical Inst. RAS, Russian Federation.* The possibilities of measuring the intensity of the electric field in high-pressure plasma with non-linear optics methods are studied. The measurements of the electrical field intensities dynamics in impulse discharges are presented.	LTuJ2 • 17:30-17:45 • ORAL ***Er,Yb:GdAl3(BO3)4 Laser Passively Q-Switched by MBE-grown Cr:ZnS/Cr,Co:ZnS Thin Films,*** K.N. Gorbachenya, V.E. Kisel, A.S. Yasukevich, N. Tolstik, E. Karhu, V. Furtula, E. Sorokin, V.V. Maltsev, N.I. Leonyuk, U. Gibson, I.T. Sorokina, N.V. Kuleshov, *Center for Optical Materials and Technologies, Belarusian National Technical Univ., Belarus.* MBE-grown Cr:ZnS/Co,Cr:ZnS thin films were used for passive Q-switching of a diode-pumped Er,Yb:GdAl3(BO3)4 laser at 1522 nm. Laser pulses with 10.7 μJ energy and 6 ns duration at 31 kHz repetition rate were obtained.	

Hall 1 ICONO-05/2	Hall 2 ICONO-07/2	Hall 3 ICONO-04/2
17:00-18:30 ITuH ● Nonlinear Space-Time Dynamics, Instabilities, and Patterns II (ICONO-05/2)—Continued	17:00-18:30 ITuI ● Beyond Non-Linear Optics: High & Extreme Optical Field Physics II (ICONO-07/2)—Continued	17:00-18:15 ITuJ ● Nonlinear Optics and Novel Phenomena II (ICONO-04/2) —Continued
		ITuJ3 • 17:45-18:00 • ORAL ***Strong-field theory of spontaneous down-conversion for surface plasmon polaritons,*** V. Hizhnyakov*, A. Loot, *Inst. of Physics, Univ. of Tartu, Estonia.* A non-perturbative theory of spontaneous down-conversion of surface plasmon polaritons is presented. We found that the process is enhanced for typical excitation power of few kW. At stronger excitation the yield of process rapidly decreases.
ITuH3 • 18:00-18:15 • ORAL ***Nonlinear dynamics and current state formation of exciton-polaritons in 1D periodic potential,*** I.Yu. Chestnov, M.V. Charukhchyan, A.V. Yulin, A.P. Alodjants, O.A. Egorov, *Vladimir State Univ., Russia.* we study the nonlinear dynamics of the exciton-polariton condensate placed in a one-dimensional lattice. Within the mean-field approach a nonlinear modification of dispersion of a condensate Bloch state is predicted.	ITuI3 • 18:00-18:15 • ORAL ***Synchronized proton acceleration from hydrogenated low dense carbon nanotube targets,*** A. V. Brantov, E. A. Govras, P. A. Ksenofontov, V. Yu. Bychenkov, *P.N. Lebedev Physical Inst., RAS, Russia.* A principally new concept of ion acceleration from low-density targets for proton acceleration have been recently proposed on the basis of synchronized propagation of the laser pulse and accelerated proton bunch (synchronized acceleration by slow light – SASL). We present simple analytical model of continuous ion acceleration in SASL regime. By using 3D PIC simulation we have studied effect of laser polarization, pre-plasma at the target front side, and hydrogen concentration in a target on proton acceleration. Special attention was paid to proton acceleration from current-day advanced low dense carbon nanotube targets. The dependencies of proton maximum energy and high-energy proton yield on laser intensity and hydrogen concentration are presented. It has been demonstrated that SASL regime in low dense targets may double maximum proton energy in comparison with the idealized/optimized thin foils in the best choice regime of entire volumetric target heating and provide significant proton energy increase as compared to conventional TNSA regime. It has been shown that a proper choice of target density profile allows one to improve ion synchronization with the laser triggered ponderomotive sheath to increase efficiency of ion acceleration.	ITuJ4 • 18:00-18:15 • ORAL ***Dynamics of stimulated atom-molecular conversion in mixture of two Bose-gases assisted by Gauss pulses,*** P.I. Khadzhi, A.P. Zingan, *Dniester State Univ., Moldova.* The dynamics of stimulated Raman atom–molecular conversion in a Bose–Einstein condensate, i.e., the periodic or aperiodic oscillations of densities of two kinds of Bose atoms into a heteronuclear molecule has been studied.
ITuH4 • 18:15-18:30 • ORAL ***Numerical modeling of space-temporal dynamics in fiber lasers,*** Yu.A. Mazhirina, L.A. Melnikov, V.A. Razukov, S.V. Sukhanov, *Yuri Gagarin State Technical Univ. of Saratov, Russia.* Using different upwind-type algorithms realizations and density-matrix equations for active medium long-time space-temporal dynamics of electromagnetic field in fiber lasers is investigated numerically during hundreds of round trips. Accompanying physical effects are demonstrated and discussed.	ITuI4 • 18:15-18:30 • ORAL ***Theoretical parametrization of ion spectra from expanding foils in laser-plasma interaction,*** E. A. Govras, V. Yu. Bychenkov, A. V. Brantov, *All-Russia Research Inst. of Automatics, Russia.* This work concerns theoretical description of obtaining ion spectra during expansion of hot plasma slab into vacuum. Reasonable connection of main model parameters with ones of laser and plasma provides good agreement with full 3D simulation.	

Hall 4 LAT-03/2	Hall 5 LAT-01/6	
17:00-18:45 LTuI ● Ultra-Fast Diagnostics in Laser Research (LAT-03/2)—Continued	17:00-18:30 LTuJ ● Laser System and Materials VI (LAT-01/6)—Continued	
	LTuJ3 • 17:45-18:00 • ORAL *LD–pumped 4 mJ passive Q–switched Yb,Er:glass laser with improved spatial, temporal and spectral properties,* M.V. Bogdanovich, A.V. Grigor'ev, V.A. Dlugunovich, A.V. Isaevich, A.V. Holenkov, K.V. Lepchenkov, K.I. Lantsov, A.G. Ryabtsev, G.I. Ryabtsev, M.A. Shchemelev, U.S. Tsitovets, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Energy, spatial, spectral and temporal properties of ultra compact 4 mJ Yb,Er:glass laser developed on the base of improved unorthodox optical scheme has been measured using certified equipment in the ISO/IEC 17025 accredited laboratory.	
LTuI3 • 18:00-18:30 • INVITED *"Femtosecond Pump-to-Probe Spectroscopy of primary events in photosynthesis",* D. Cherepanov, F. Gostev, M. Mamedov, I. Shelaev, A. Semenov, V. Shuvalov, *N.N.Semenov Inst. of Chemical Physics Russian Academy of Sciences,, Russian Federation.* The femtosecond pump-probe spectroscopy revealed the ultrafast charge separation in photosystem 1 with time constant 100 fs. This reaction of the primary charge separation is one of the fastest reactions in photobiology.	LTuJ4 • 18:00-18:15 • ORAL *The Distortions of Laser Pulse Profile Caused by Multi-Pass Amplification,* O.L. Vadimova, I.B. Mukhin, O.V. Palashov, *Inst. of Applied Physics of the RAS, Russian Federation.* The comparison of laser pulse amplification in long rod and multi-pass disk elements was carried out. It was demonstrated that using of multi-pass amplifiers allows reducing temporal profile distortion	
	LTuJ5 • 18:15-18:30 • ORAL *Laser-Induced Ignition of a Cryogenic Rocket Engine,* R. Stützer, M. Büorner, M. Oschwald, *DLR - German Aerospace Center Inst. of Space Propulsion, Germany.* Using a pulsed Nd:YAG laser system and a research combustor, cryogenic rocket propellants have been ignited. The ignition spark and the subsequent combustion where analyzed. Optical measurements on well-defined gas mixtures served as calibration method for equivalent ratio determination.	

Tuesday, September 27, 2016

Hall 1 ICONO-05/2	Hall 2 ICONO-07/2	Hall 3 ICONO-04/2

Hall 4 LAT-03/2	Hall 5 LAT-01/6	
17:00-18:45 LTuI • Ultra-Fast Diagnostics in Laser Research (LAT-03/2)—Continued	17:00-18:30 LTuJ • Laser System and Materials VI (LAT-01/6)—Continued	

LTuI4 • 18:30-18:45 • ORAL
Dynamics of Photoinduced TICT-process for Thioflavin T in n-Alcohols, V. Stsiapura, O. Bouganov, S. Tikhomirov, *Yanka Kupala State Univ., Belarus.* It has been established earlier that fluorescence quantum yield of Thioflavin T (ThT) – a probe widely used for amyloid fibrils detection – is viscosity-dependent and photophysical properties of ThT can be well-described by the fluorescent molecular rotor model, which associates twisted internal charge transfer (TICT) reaction with the main non-radiative decay process in the excited state of the dye. Solutions of ThT in 1-propanol, 1-pentanol, and 1-hexanol were studied using femtosecond transient absorption spectroscopy methods and we showed that solvent viscosity was the main factor that influenced TICT rate for ThT in alcohols.

ITuK • 18:30-20:00
Quantum and Atom Optics (ICONO-01): Posters

ITuK1
Simulation of laser cooling using cellular automata, S. Arabey, I. Nilov, Yu. Rozhdestvensky, *ITMO Univ., Russia.* This work is devoted to the simulation of longitudinal laser cooling of atomic beam using cellular automata. We are show that this technique describes correctly the process of cooling without solving equation for distribution function.

ITuK2
SU(2) orbits and their uncertainty limits, S. Shabbir, G. Björk, *Royal Inst. of Technology (KTH), Sweden.* Commutation relations allow us to write uncertainty relations for the generators of the SU(2) group. Here we show that these relations, however, do not lead to tight, saturable bounds and present an alternative approach.

ITuK3
Laser cooling of atoms in standing wave: Statistical approach, R.Y. Ilenkov, O.N. Prudnikov, A.V. Taichenachev, V.I. Yudin, *Inst. of Laser Physics SB RAS, Russia.* Developed a statistical approach, which provides information about the cooling time of an atomic ensemble without directly solving a dynamic problem. Existence of optimal in terms of cooling time frequency detuning of the field from resonance was discovered.

ITuK4
Nonlinear dynamic of ion in arbitry RF-traps, I. Kosinskiy, A. Nikolaeva, Yu. Rozhdestvensky, S. Rudyi, *ITMO Univ., Russia.* Present article shows behavior of ion in nonlinear RF-traps with N=6,…,30 numbers of electrodes, including expressions for the effective potential and areas of ion localization. The nonlinear nature of dynamic is represented by Poincare section.

ITuK5
Precision spectroscopy of cold magnesium atoms localized in a magneto-optical trap, M. Tropnikov, A. Bonert, D. Brazhnikov, A. Goncharov, *Inst. of Laser Physics SB RAS, Russia.* In this paper, the results of experimental research aimed at creation of the optical frequency standard based on cold Mg atoms are presented. Narrow reference lines are obtained, frequency stabilization by observed resonances is performed.

ITuK6
Spectrum of a single-qubit laser, T.B. Karlovich, *Belarusian State Technological Univ., Belarus.* Multipeak spectrum for a single-qubit laser in presented. The explanation of position and width of spectrum lines on the basis of Jaynes-Cummings model with damping is proposed. The influence of dephasing on spectrum is considered.

ITuK7
Optical properties of nanosystems in external electric and magnetic fields, E.P. Sinyavskii, N.S. Kostyukevich, *Pridnestrovian State Univ. named T.G. Shevchenko, Moldova.* Theoretically investigated the luminescence of light associated with interband transition of an electron in a nanosystems in the transverse magnetic field and the transverse electric field. In the presence of a magnetic field, there are additional energy states, which leads to a richer range of luminescence bands. The electric field substantially affects the width of the forbidden zone of nanostructures, and on the processes of interaction of carriers with a rough surface

ITuK8
Optical frequency transfer over fiber link with phase noise compensation, K.S. Kudeyarov, G.A. Vishnyakova, K.Yu. Khabarova, N.N. Kolachevsky, *P.N. Lebedev Physical Inst., RAS, Russia.* We demonstrate operation of a test short fiber link for ultra-stable optical frequency dissemination using the phase information of the carrier at 1.14 μm. Using active fiber noise compensation a frequency instability of $1.25x10^{-19}$ in 1000 s is obtained.

ITuK9
Dynamic steady-state of periodically driven quantum systems, M. Yu. Basalaev, V. I. Yudin, A. V. Taichenachev, *Novosibirsk State Univ., Russia.* Using the density matrix formalism, we prove the existence of the periodic steady-state for an arbitrary periodically driven system described by linear dynamic equations. The presented derivation simultaneously contains a simple and effective computational algorithm, which automatically guarantees a full account of all frequency components.

ITuK10
Generation of GHZ states by single-photon cloning, P.P. Gostev, S.A. Magnitskiy, *Department of Physics and International Laser Center, Lomonosov Moscow State Univ., Russia.* Here we present a new scheme of three-, four-mode and modified three-mode GHZ states generation, and light-to-light entanglement swapping. It is based on single-photon cloning by the type-I entangled amplification in two-crystal OPA.

ITuK11
Nonclassical states generation in a system with non-ideal nonlinear coherent loss and pulse coherent pump, A.A. Sakovich, A.B. Mikhalychev, *B. I. Stepanov Inst. of Physics, NASB, Belarus.* Minimal Mandel parameter of the states, generated in a system with non-ideal nonlinear coherent loss and pulse coherent excitation, is shown to depend only on mean photon number of the state regardless of regime's parameters.

ITuK12
Translational optical cooling of charged nanocrystals doped by Yb3+ ions, A. Ivanov, A. Kovalev, V. Polyakov, Yu. Rozhdestvensky, S. Rudyi, *ITMO Univ., Russia.* The translational laser cooling of the charged CaF2 nanocrystals doped by Yb^{+3} ions in linear RF Paul trap the field of three-dimentional standing waves are investigated.

ITuK13
Analysis of applicability of different basis sets in data pattern tomography for single- and double-mode optical quantum states, V.S. Reut, A.B. Mikhalychev, D.S. Mogilevtsev, *B.I. Stepanov Inst. of Physics, NAS of Belarus, Nezavisimosti ave., 68, Minsk, Belarus; Belarusian State Univ., Nezavisimosty Ave. 4, 220030, Minsk, Belarus, Belarus.* We substantiate and analyze the choice of the discrete basis set of coherent states in data pattern tomography, finding the optimal parameters of this sets and expansions for given quantum states with small average number of photons.

ITuK14
Magic wavelength for 1.14 um magnetic dipole transition in Tm, A. Golovizin, E. Kalganova, G. Vishnyakova, D. Sukachev, K. Khabarova, V. Sorokin, N. Kolachevsky, *P.N. Lebedev Physical Inst., RAS, Russia.* We consider 1.14 μm magnetic dipole transition in Tm as a candidate for a 2D optical lattice clock. We've calculated dynamic polarizabilities for both clock sublevels and now experimentally search for magic wavelength around predicted 807 nm.

ITuK15
Method of long- and medium-distance entanglement generation by using optical "elimination" measurements, I.L. Karuseichyk, A.B. Mikhalychev, S.Ya. Kilin, *B.I. Stepanov Inst. of Physics, Belarus.* Method for creation of entangled pairs of optical analogues of qubits and qutrits over medium and long distances is proposed. The probability of successful generation is estimated and the advantage of the repeaters-based protocol is demonstrated.

ITuL • 18:30-20:00
Quantum Information Science, Engineering, and Technologies (ICONO-02): Posters

ITuL1
Non-locality of quantum correlations and illusion of superluminal interaction, T.F. Kamalov, Yu.P. Rybakov, M.G. Falchenko, *Moscow Inst. of Physics and Technology, Russian Univ. for Cooperation, Russia.* We discuss the problem of non-locality of quantum correlation of microobjects in entangled states. In this case the illusion of the instantaneous transfer of entangled quantum objects follows from the experimental observations of nonzero correlations of the states in question. The effect of quantum correlations and non-locality of quantum states can be explained by the random character of interactions if extended particles. Such an approach can be realized within the scope of Ostrogradski higher derivatives formalism. It should be stressed that the fact of quantum non-locality and quantum correlations does not mean any real transfer of physical objects.

ITuL2
Impact of polarization deviation on the states of photons produced by a double-crystal scheme, D. Frolovtsev, S. Magnitskiy, *Department of Physics and International Laser Center, Lomonosov Moscow State Univ., Russia.* We analyze the double-crystal scheme for generation of polarization-entangled photons and impact of the polarization deviation on the produced state. We show the role of this effect and the way to compensate arising entanglement losses

ITuM • 18:30-20:00
Nonlinear Space-Time Dynamics, Instabilities, and Patterns (ICONO-05): Posters

ITuM1
Symmetry of living nature in dynamics of vector-field lasers, L.P. Svirina, *Belarussian National Technical Univ., Belarus.* On the basis of developed and experimentally tested models of gas class A lasers, we consider by what way the longitudinal magnetic field, multimode operation, competition between the active medium and the empty cavity anisotropies, linear coupling, as well as random fluctuations, influence the dynamical behavior of periodical regimes of lasing, whose symmetry is analogous to symmetry, existing in living nature.

ITuM2
Vortex pulsed beam trapping into light bullet in Kerr media, O. Fedotova, T. Smirnova, O. Khasanov, G. Rusetsky, N. Aleksić, E. Gaižauskas, *Scientific-Practical Material Research Centre, NASB, Belarus.* High-intensity vortex pulsed beam trapping by light bullet in Kerr media is studied. As shown well-balanced competition of all underlying processes provides stability of vortex light bullet with transverse and temporal radii corresponding stationary solutions.

ITuM3
Dynamics of adaptive tilt correction of collimated beam at the end of atmospheric path, A.V. Blank, V.V. Kapranov, I.S. Matsak, N.A. Suhareva, V. Y. Tuganeko, *Lomonosov Moscow State Univ., S.P Korolev Rocket and Space Corporation "Energia", Russia.* Results of experimental tests of tilt adaptive control algorithms based on quadrant detection of beam are presented. Several criteria for choosing detector frequency, tilt step and memory size are given.

ITuM4
Resonance fluorescence from an ensemble of optical centres with cooperativities produced

by a dielectric host, N.A. Lozing, M.G. Gladush, *Moscow Inst. of Physics and Technology, Russia.* We study theoretically the possibility of spontaneous switching between dim and bright fluorescence of a cooperative ensemble driven by a cw laser. A numerical analysis of transient regimes and transformations of the fluorescence spectrum are reported.

ITuM5
Transmission and reflection of two pulses of laser radiation by thin semiconductor films, A.V. Corovai, A.G. Mangir, P.I. Khadzhi, *Dniester State Univ.. Inst. of Applied Physics ASM, Moldova.* Taking into account the two-photon biexciton excitation, optical exciton-biexciton conversion and exciton-photon interaction the peculiarities of two supershort laser pulses transmission by thin semiconductor film are investigated. Both the superluminal and ultraslow propagation of pulses and the appearance of the reflected pulses in the absence of the incident one are predicted.

ITuM6
Generation of tunable two-dimensional Airy light beams, A. Ropot, N. Khilo, P. Ropot, *Stepanov Inst. of Physics, NASB, Russia.* It was shown both theoretically and experimentally that the phase modulation of input optical field by spatially adjusted sinusoidal phase grating followed by optical Fourier transformation allows to generate a tunable Airy beam.

ITuM7
Bessel-like light beams with azimuthally discreet spatial spectrum, N. A. Khilo, A. P. Ropot, P. I. Ropot, *Stepanov Inst. of Physics, NASB, Russia.* An optical scheme was proposed for production of Bessel-like beams having annular local spatial spectrum. The scheme is the modification of the well-known circular ring scheme for obtaining Bessel beams and it differs by replacing the continuous ring on the discreet set of microholes. The calculation of the output filed was made and its difference from standard Bessel beam is studie

ITuM8
Investigation of light bullets dynamics in LiF by mid-IR laser coloration, S.V. Chekalin, V.O. Kompanets, A.V. Kuznetsov, A.E. Dormidonov, V.P. Kandidov, *Stepanov Inst. of Physics, NASB, Russia.* Strictly periodic color cen¬tres structure was detected in LiF under filamentation of a single Mid-IR laser pulse. It is numerically shown that its for¬mation is due to the periodic change of the light field amplitude in a light bullet formed under filamentation

ITuM9
Beam shaping by hyperbolic metamaterials with extremal optical characteristics, S. Kurilkina, V. Belyi, N. Kazak, *Stepanov Inst. of Physics, NASB, Belarus.* The possibility is shown and conditions are found for realization of the metal/dielectric multilayer structure displaying different types of hyperbolic dispersion within spectral regions which are separated by the wavelength of dielectric singularity. It is grounded that quasi diffraction-free propagation of Gaussian light beams with wavelength occurs.

ITuN • 18:30-20:00
Symposium "Diamond and Silicon Carbid Based Quantum Information Technologies" (ICONO-06): Posters

ITuN1
Precision Measurements of Raman Scattering for Synthetic Diamond Single Crystals, G.A. Gusakov, N.V. Belko, M.P. Samtsov, E.S. Voropay, *A.N. Sevchenko Inst. of Applied Physical Problems, Belarusian State Univ., Belarus.* The method based on sequential recording of the Stokes and anti-Stokes spectral components of Raman scattering offers high-precision measurements of the phonon energy and makes it possible to analyze minor effects in crystals

ITuN2
Robast 13C nuclear spins in the "NV-axial 13C" complexes in diamond: Hyperfine and spatial characteristics by DFT Simulation of the $C_{510}[NV]H_{252}$ Cluster, A.P. Nizovtsev, S.Ya. Kilin, A.L. Pushkarchuk, S.A. Kuten, V.A. Pushkarchuk, *Stepanov Inst. of Physics, NASB, Belarus.* Using DFT simulation of the cluster $C_{510}[NV]H_{252}$ hosting the NV center we calculated hyperfine interaction (hfi) matrices for eight specific, located on the NV axis, positions of ^{13}C nuclear spins characterized by the absence of hfi-induced flip-flops.

ITuN3
Optical properties of CVD diamonds – Before and after different post grown treatment, V.G.Vins, A.P.Yelesseyev, *VELMAN, Ltd, Russia.* By optical spectroscopy investigated CVD diamonds - as in the initial state and after various post grown treatments. The mechanisms of transformation of the defects and the possibility of high-tech applications of crystals

ITuO • 18:30-20:00
Symposium "Beyond Non-Linear Optics: High & Extreme Optical Field Physics" (ICONO-07): Posters

ITuO1
Electron dynamics in the tightly focused relativistically strong femtosecond laser pulse, K. Ivanov, O. Vais, S. Bochkarev, I. Tsymbalov, V. Bychenkov, R. Volkov, A. Savel'ev, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* The study of electron motion under the action of relativistic tightly focused femtosecond laser radiation is presented. Particles with energy up to several hundreds of keV may be accelerated directly by the EM field of the pulse.

ITuO2
New method of high-intensity laser pulse diagnostics by using ultrathin foils, O.E. Vais, S.G.Bochkarev, S. Ter-Avetisyan, V.Yu. Bychenkov, *Center for Fundamental and Applied Research, Dukhov Research Inst. of Automatics (VNIIA), Russia.* The new method of high intensity laser pulse diagnostic via direct electron acceleration from ultrathin foils is suggested. The pulse is considered to be focused by off-axis parabolic mirror which is described by Stratton-Chu integrals.

ITuO3
Gamma-ray emission in Weibel instability, E. N. Nerush, D. A. Serebryakov, I. Yu. Kostyukov, *Inst. of Applied Physics, RAS, Russia.* Numerical simulations show that the overall energy of the synchrotron photons emitted during the rise of Weibel instability can be as high as the energy of the magnetic field.

LTuK • 18:30-20:00
Laser System and Materials (LAT-01): Posters

LTuK1
Influence of impurities on heat-mass transfer during laser cladding of metal powders, M.D. Khomenko, F.Kh. Mirzade, A.V. Dubrov, *Inst. on Laser and Information Technologies - Branch of the Federal Scientific Research Center "Crystallography and Photonics" of RAS, Moscow Region.* Self-consistent model of heat-mass transfer is developed for numerical investigation of laser cladding with coaxial powder injection. The effect of impurity concentration on surface tension, material thermal properties and buoyancy force is shown. 3D distributions of macroscopic fields are numerically investigated and verified for different process parameters and cladded materials.

LTuK2
The Matrix Effect on the Generation of Neodymium Laser with Quasi-Three-Level Scheme, V. Herasimenka, R. Navitskaya, I. Stashkevich, *Belarussian State Univ., Belarus.* The generation characteristics of a neodymium laser with a quasi-three-level scheme have been considered in the case of the most extensively used crystalline matrices. The threshold pump powers and the generation efficiencies have been compared. It has been shown that the emission and absorption cross-sections are critical for the generation efficiency.

LTuK3
Color Centers Transient Absorption and Ultrashort Pulse Lasing from LiLu0.7Y0.3F4:Ce3+ Active Medium, I. I. Farukhshin, A. S. Nizamutdinov, V. V. Semashko, S. L. Korableva, M. A. Marisov, *Kazan Federal Univ., Russia, Tatarstan republic.* We have obtained the single pulse laser oscillation with 400 ps at 311 nm from LiLu0.7Y0.3F4:Ce3+ crystal. Short pulse was obtained from intracavity loss modulation via pump-induced color centers bleaching. Modulation of intracavity losses is regulated via color centers concentrations.

LTuK4
Fold reduction in the lasers flash lamp discharge threshold at high frequency pumped, A.M. Valshin, S.M. Pershin, G.M. Mikheev *Prokhorov General Physics Inst. of RAS, Russia.* Experimentally studied the processes controlling the parameters of the gas-discharge plasma in the standard cylindrical lasers flash lamp by varying the frequency of the supply voltage. It is shown that when the frequency is changed from 20 kHz to 3 MHz the fold reduction by factor of 5 in the discharge threshold is achieved.

LTuK5
Luminescence and stimulated emission in the heavily doped AlGaN:Si structures by optical pumping, I. V. Osinnykh, T. V. Malin, V.F. Plyusnin, K. S. Zhuravlev, P. A. Bokhan, Dm. E. Zakrevsky, N.V. Fateev, *Rzhanov Inst. of Semiconductor Physics, Siberian Branch of the Russian Academy of Sciences, Russia.* The intensive defect-related band in photoluminescence spectra of heavily doped AlxGa1-xN:Si layers grown by molecular beam epitaxy covering the whole visible and near-infrared region of the spectrum shifts from 600 nm to 405 nm with the increase of Al content from 0.47 to 1. The gain of the active medium was about 14.5 cm^{-1}.

LTuK6
Tunable Diode-Pumped Dye Laser, O.A. Burdukova, M.V. Gorbunkov, V.A. Petukhov, V.A. Povedailo, M.A. Semenov, *State Scientific Institution B.I. Stepanov Inst. of Physics National Academy of Sciences of Belarus, Belarus.* We developed a tunable dye laser with astigmatism-compensated 3-mirror cavity pumped by semiconductor diode lasers. The widest obtained tunability was approximately 90 nm with pyrones family dye. The highest slope efficiency obtained was 18% in non-selective resonator with laser dye C540A.

LTuK7
Measurement Method of Thermo-Optical Characteristics of Cubic Crystals Using Samples of Arbitrary Orientation, E.A. Mironov, A.V. Vyatkin, O.V. Palashov, *Inst. of Applied Physics of the RAS, Russia.* A method for measuring thermo-optical characteristics of cubic crystals having arbitrary orientation has been developed. Unlike the traditional techniques, it does not demand samples of specified orientation. It greatly expands the scope of method applications.

LTuK8
Spectroscopic Characterization of Er3+:K2YF5: a Novel Potential Laser Crystal, E. Vilejshikova, P. Loiko, N. Khaidukov, M. Brekhovskikh, X. Mateos, M. Aguiló, K.

Yumashev, *Center for Optical Materials and Technologies, Belarusian National Technical Univ., Belarus.* Spectroscopic properties of Er3+ ions in K2YF5 crystals relevant for their applications in "eye-safe" lasers are studied. The Judd-Ofelt parameters for Er3+:K2YF5 are Ω2 = 1.216, Ω4 = 0.647 and Ω6 = 0.459×10-20 cm2 and the radiative lifetimes of the 4I13/2 and 4I11/2 states are 14.9 ms and 17.4 ms, respectively. The absorption, stimulated-emission and gain cross-sections, as well as non-radiative relaxation rates are determined. The maximum σSE is 0.72×10-20 cm2 at 1531 nm.

LTuK9

A femtosecond laser based on variable-cut YVO4:Nd3+-YVO4 crystal, A.A. Sirotkin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The method of optimizing the parameters of the luminescence spectra of crystals vanadate proposed. For the first time demonstrated the work of femtosecond laser-based on variable-cut (θ = 25 °, φ=0) YVO4-Nd3+: YVO4- crystal with passive mode locking in the SESAM. The minimum pulse duration of 780 fs reached.

LTuK10

Semiconductor laser diode into asymmetrical V-shaped cavity with spectrally- and phase-nonselective feedback mirror., V.V. Svetikov, V.I. Pustovoy, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The broad area laser diode lasing into external asymmetrical V-shaped cavity with non spectral- and non phase-selective feedback mirror has been experimental investigated. The detection of phase synchronization ability of filaments was the main goal of experiments.

LTuK11

Phase field approach to solidification including stress effects at laser sintering of metal powders, F.Kh. Mirzade, *Inst. on Laser and Information Technologies - Branch of the Federal Scientific Research Center "Crystallography and Photonics" of RAS, Russia.* The influence of stresses on solidification microstructures during laser sintering of ultrafine powders is considered using a phase field approach. Coupling equations among phase, temperature, concentration and stress are derived based on thermodynamic laws. A linear stability analysis of solidification front is carried out, to find dispersion relations and a spectrum of wave numbers of unstable perturbations. It is shown that the strain field generated during microstructure evolution is important factor that affects the instability mode.

LTuK12

Effect of preferential solubility of a commercial LC mixture on the electro-optical properties of Polymer dispersed liquid crystal films, A. Bouriche, L. Alachaher-Bedjaoui, A.V. Konkolovich, A.A. Miskevich, V.A. Loiko, U. Maschke, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The eutectic nematic Liquid Crystal (LC) mixture E7 presents preferential solubility effects towards Poly(2-ethylhexylacrylate), thus leading to composition changes of LC confined in phase separated domains, evidenced by several experimental techniques.

LTuK13

Improvement of output characteristics of yellow-green Cd(Zn)Se/ZnSe lasers using reflective and anti-reflective optical coatings, A. Alyamani, A.G. Vainilovich, V.N. Pavlovskii, E.V. Lutsenko, G.P. Yablonskii, S.V. Gronin, S.V. Sorokin, I.V. Sedova and S.V. Ivanov, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Highly reflective and anti-reflective optical coatings were deposited on the working facets of the optically pumped green-emitting II-VI heterostructure laser. A blind mirror was formed on the one cleaved facet of the crystal by deposition of SiO2/ZrO2 DBR coating, while single Al2O3 layer AR coating was deposited on its top surface. As a result, the laser showed nearly two-fold reduction in the lasing threshold pumping power and an increase of the differential efficiency. These results are an important milestone to high efficiency microchip laser converters emitting in the green-yellow spectral range.

LTuK14

Raman Spectra of Double Crystals of Ca10Me(VO4)7 (Me = Li, K, Na), S.V. Voitikov, I.A. Khodasevich, V.A. Orlovich, M.B. Kosmyna, A.N. Shekhovtsov, *A.M. Prokhorov General Physics Inst., RAS, Belarus.* The nonpolarized Raman spectra of double calcium orthovanadates Ca10M(VO4)7 (M = Li, K, Na) crystals in the Raman shifts range of 150-1600 cm-1 have been measured for the first time and decomposed into Voigt profiles

LTuK15

Influence of Diamond Nanoparticles on the electro-optical properties of Polymer Dispersed Liquid Crystal films, C. Beyens, F. Dubois, Z. Bouberka, M. Elouali, O. Yaroshchuk, A.V. Konkolovich, A.A. Miskevich, V.A. Loiko, U. Maschke, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Small amounts of diamond nanoparticles lead to a strong decrease of the optical transmittance of Polymer Dispersed Liquid Crystal films under an applied electrical field, due to the formation of micron-sized aggregates.

LTuK16

The active medium of lasers based on inclusion complexes Phenalemine 160 α- and γ-cyclodextrins, S. Anufrick, H. Sazonko, V. Tarkovsky, M. Asimov, *Yanka Kupala State Univ. of Grodno, Belarus.* Abstract: Spectral-luminescent and generation properties of dye fenalemine 160 (FN160) in inclusion complexes with α-and γ- cyclodextrin were investigated. It is established that the inclusion complex with α-CD is more effective than γ-CD, despite the smaller size of an internal cavity of a cyclodextrin. Efficiency of generation of a fenalemin 160 with increase in a share of water in solution decreases, thus the increase in concentration of a cyclodextrin in the same solution leads to increase of energy of generation.

LTuK17

Spectroscopic study of oriented Tm:SSO crystal, Yu.D. Zavartsev, A.I. Zagumennyi, Yu.L. Kalachev, S.A. Kutovoi, V.A. Mikhailov, I.A. Scherbakov, *A.M. Prokhorov General Physics Inst., RAS, RUSSIA.* Six absorption bands of Tm:SSO crystal were analyzed on the basis of decomposition of each band to a number of Lorentz peaks. This analysis was applied to all possible combinations of crystal axis orientations and light polarization. The result is performed as a table of peak parameters: (wavelength, height, width).

LTuK18

The acousto-optically Q-switched Tm:Ho:YbAG laser pumped at 1678 nm, Yu.D.Zavartsev, A.I.Zagumennyi, Yu.L.Kalachev, S.A.Kutovoi, V.A.Mikhailov, I.A.Scherbakov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Lasing of the acousto-optically Q-switched Tm:Ho:YbAG laser was realized. Laser demonstrated a good slope ~ 30% and total 11% efficiencies and output power up to 80 mW at pulse repetition rate of 50 kHz. It was found a great influence of upconversion effects on laser efficiency

LTuK19

Optical and electro-optical characterization of electronbeam- and UV-cured polymer/liquid crystal systems, M. Bouchakour, Y. Derouiche, Z. Bouberka, F. Dubois, C. Beyens, L. Mechernène, F. Riahi, A.V. Konkolovich, A.A. Miskevich, V.A. Loiko, Ulrich Maschke, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* This work is focused on the relationship between the polymerization method, such as UV radiation and high voltage accelerated electron beams, and the physical properties, including morphologies and electro-optic responses, of polymer/liquid crystal systems.

LTuK20

Structural Parameters of Defects in the Interface of GaN/AlN Superlattices, Y.V. Lebiadok, T.V. Bezyazychnaya, K.S. Zhuravlev, *SSPA "Optics, Optoelectronics & Laser Technology", Belarus.* The influence of point defects (nitrogen and aluminium vacancies) on characteristics of the heterointerface of GaN/AlN superlattices is discussed. The geometry of the defects obtained using the quantum chemistry calculation is compared with experimental one.

LTuK21

Transverse Mode Locking of Stimulated Raman Scattering in Diode End-Pumped Nd:YVO4/Cr4+:YAG Laser, V.V. Bezotosnyia, M.V. Gorbyncov, V.I. Dashkevich, A.L. Koromyslov, V.A. Orlovich, Yu.M. Popov, V.G. Tunkin, E.A. Cheshev, R.V. Chulkov, *P.N. Lebedev Physical Inst. of RAS, Russia.* Transverse mode locking of the Stokes component stimulated Raman scattering self-conversion by a pulse diodes end-pumped Nd:YVO4/Cr:YAG laser is implemented for the first time under conditions of frequency degeneracy of cavity modes.

LTuK22

Laser excitation of ultrasound modes of nonlinear-optical crystals for optical absorption measurement, A. A. Molkov, A. V. Konyashkin, O. A. Ryabushkin, *Moscow Inst. of Physics and Technology, Russia.* Novel method for measuring low optical absorption coefficients of crystals and glasses is introduced. It is based on measuring crystal equivalent temperature by registration of its temperature dependent acoustic resonances directly excited by laser radiation.

LTuK23

The module of laser illumination based on the powerful AlGaAs/GaAs laser diode matrix, D.V. Shabrov, V.V. Kabanov, Y.V. Lebiadok, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The present paper is aimed to development of the powerful illumination module of short laser pulses with high repetition rate, the given direction characteristic and the stabilized radiation parameters.

LTuK24

Cryogenic Plasma Chemistry of Slab RF Discharge CO Laser Active Medium, A.A. Ionin, A.Yu. Kozlov, L.V. Seleznev, D.V. Sinitsyn, *P.N. Lebedev Physical Inst. of the Russian Academy of Sciences, Russia.* The features of lasing in a sealed-off RF discharge CO laser with cryogenic cooling are discussed. Influence of addition of oxygen into active medium on the long-time stability of laser generation is analyzed. Phenomenological description of combination of electric plasma-chemical, gas dynamic and diffusion processes determining the behavior of the laser output characteristics over the entire operating cycle is presented.

LTuK25

Numerical investigation of multichannel laser beam phase locking in turbulent atmosphere, V.A. Volkov, M.V. Volkov, S.G. Garanin, F.A. Starikov, *Russian Federal Nuclear Center, All-Russian Research intsititut for experimental physics, Russia.* The efficiency of coherent multichannel beam combining under focusing through a turbulent medium on a target in the cases of phase conjugation and target irradiation in the feedback loop is investigated numerically in various approximations. The conditions of efficient focusing of multichannel radiation on the target are found. It is shown that the coherent beam combining with target irradiation in the feedback loop, which does not require a reference beam and wavefront measurements, is as good as the phase conjugation approach in the

efficiency of focusing. It is found that the main effect of focusing is provided by properly chosen phase shifts in the channels, whereas taking into account local wavefront tip tilts weakly affects the result.

LTuK26
Application of PLD to Obtain Solid Lubricant Coatings Containing Spherical Metal Nanoparticles, D.V. Fominski, R.I. Romanov, V.Yu. Fominski, A.G. Gnedovets, *National Research Nuclear Univ. MEPhI (Moscow Engineering Physics Inst.), Russia.* Pulsed laser deposition was used to obtain nanocomposite MoSe2/Mo coatings (Mo nanoparticles in MoSe2 matrix) with excellent tribological properties (friction coefficient 0.02–0.04). Concentration of nanoparticles was varied by changing the conditions of plume expansion.

LTuK27
Superluminescent diode seeding of parametric amplifier at picosecond pumping, K.A. Vereshchagin, S.N. Il'chenko, V.B. Morozov, A.N. Olenin, V.G. Tunkin, D.V. Yakovlevв, S.D. Yakubovich, *International Laser Centre & Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Broadband picosecond pulses are produced by dual-cascade parametric amplifiers based on BBO crystals seeded by cw superluminescent diodes with bandwidth ≈300 cm-1, central wavelength 790 nm and high spatial coherence and pumped by second harmonic of Nd:YAG laser pulses of 20 ps pulse width.

LTuK28
Bessel Light Beam of the Second Order Formation with Uniaxial Crystal, I. V. Balykin, A. A. Ryzhevich, A. G. Mashchenko, V. E. Leparskii, N. A. Khilo, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* We investigate the effective method for shaping the Bessel light beam of the second order from the initial Gaussian beam using a uniaxial crystal. We propose optimal configuration of optical scheme for the method.

LTuK29
Theoretical Description of DFB Dye Lasing by Polarization Modulation, D.V. Novitsky, V.M. Katarkevich, T.Sh. Efendiev, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* We propose two approaches to theoretical description of DFB dye lasing by polarization modulation: the ones based on modified rate equations and on density matrix equations respectively. Results of numerical calculations are presented as well.

LTuK30
New efficient laser dyes for the red region. Periindenones, S.P. Belov, O.A. Burdukova, I.V. Komlev, V.A. Petukhov, V.A. Povedailo, M.A. Semenov, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Lasing characteristics of 9 new dyes in ethanol were measured in the selective and broadband resonators These dyes belong to periindenones including benzanthrones and phenalemines. We measured the tuning curves and established the areas of wavelength tuning. Investigated dyes are lasing in the orange and red regions of the spectrum. Some substances are superior to commonly used laser dyes for energy efficiency and the tuning range width.

LTuK31
Phase locking of seven-channel continuous wave fiber laser system by using stochastic parallel gradient algorithm, M.V. Volkov, S.G. Garanin, U.V. Dolgopolov, A.V. Kopalkin, S.M. Kulikov, D.N. Sinyavin, F.A. Starikov, S.A. Sukharev, S.V. Tutin, S.V. Khohlov, D.A. Chaparin., *RFNC – VNIIEF, Russia.* The work is devoted to phase locking of seven-channel continuous wave fiber laser system based master oscillator+multichannel power amplifier scheme by stochastic parallel gradient (SPG) algorithm. The dynamic phase locking of laser system has been demonstrated at the system bandwidth 14 kHz, the time of phasing was 3-4 ms.

LTuK32
High-Efficiency Laser Based on 4.5%Tm:KLu(WO4)2 Octagon Rod, S.M. Vatnik, I.A. Vedin, P.F. Kurbatov, A.A. Pavlyuk, *Inst. of Laser Physics SB RAS, Russia.* A diode-pumped laser based on Tm:KLu(WO4)2 octagon rod is realized. The maximum slope efficiency of 47% with respect to the absorbed pump power obtained with 4.5at.%Tm:KLu(WO4)2 corresponds to a maximum output power as high as 6 W at 1952 nm in CW operation.

LTuK33
Application of X-ray radiation for manufacturing of BBO optical samples with greater efficiency., I.I. Kalashnikova, V.S. Naumov, G.Yu. Orlova, *R&D Inst. Polyus, Russia.* It was proposed the method of manufacturing of BBO optical samples with greater conversion efficiency by applying X-ray radiation

LTuK34
Application of laser to control the surface roughness based on nanoparticles luminescence effect., V.A. Bazylenko, L.V. Shaposhnikov, *Lomonosov Moscow State Univ., Russia.* Method for controlling the surface roughness involves probing the surface with laser radiation and recording photoluminescence intensity using photosensitive devices. The rough surface is covered with a layer of nanoparticles. The detected information feature used is characteristic photoluminescence of these particles, induced by the probing laser radiation. Roughness of the surface is controlled by changing the nature of photoluminescence intensity when the angle between the axis of the probing radiation and the normal to the rough surface is changed.

LTuK35
A way to control the authenticity of products based on reflected laser second harmonic generation., V.A. Bazylenko, L.V. Shaposhnikov, *Lomonosov Moscow State Univ., Russia.* The developed method makes it possible to detect secretly inflicted the security label using up a reflected laser's "giant" second harmonic and to judge the authenticity of a security under its presence or absence.

LTuK36
Connection between YVO4 slope efficiency and reticular density of various crystallographic planes, I.I. Kalashnikova, V.S. Naumov, G.Yu. Orlova, A.A. Sirotkin, *R&D Inst. Polyus, Russia.* We have received that the slope efficiency of Nd:YxR1-xVO4 (R=Gd, Sc) crystals is depended on crystallographic orientation of active element. We have supposed that it was the connection between YVO4 slope efficiency and reticular density of various crystallographic planes.

LTuK37
Semianalytical Method to Describe Small-Angle Scattering of Light by Monolayer of Polydisperse Nematic Droplets, A.V. Konkolovich, M.N. Krakhalev, A.A. Miskevich, O.O. Prishchepa, V.Y. Zyryanov, V.A. Loiko, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The approach to describe light scattering by a monolayer of nematic droplets which takes into account shape, anisotropy, director configuration, size distribution, orientation of droplets is worked out and compared with the experimental data.

LTuK38
Simulation of Coherent Transmittance and Reflectance of Ordered Sequences of Particulate Monolayers with Imperfect Lattices, A.A. Miskevich, V.A. Loiko, *A.M. Prokhorov General Physics Inst., RAS, Belarus.* The coherent transmittance and reflectance of periodic, Fibonacci, and Thue-Morse sequences of ordered monolayers of spherical particles are simulated. It is shown that two last sequences provide more possibilities to control light than periodic one.

LTuK39
High resolution spectroscopy of Ho3+ ion in the matrix of LiYF4 crystal, placed in external magnetic field, M.N. Popova, K.N. Boldyrev *Inst. of Spectroscopy, Russian Academy of Sciences, Russia.* We report on the first high-resolution optical spectroscopy study of LiYF4:Ho in an external magnetic field. Peculiarities in the hyperfine structure of holmium spectral lines are discussed for the cases H||c and H_|_c (H = 0.53 and 0.87 T). The spectra reveal a strong interaction between crystal-field levels, mediated by Zeeman and hyperfine terms in the Hamiltonian.

LTuK40
Light-induced periodic structures and their characteristics in crystals CaF2-LuF3, activated by Ce3+ and Yb3+ ions, N. F. Rakhimov, A. S. Nizamutdinov, V. V. Semashko, M. A. Marisov, S. A. Shnaidman, *Kazan Federal Univ., Russia.* Here we discuss the opportunity of using Ce-doped fluorite-type crystals as basis for amplitude photonic crystals with modulation of color centers absorption due to complex picture of the dynamic processes occurring in this medium under UV pump. The results of time resolved absorption saturation studies and key parameters of dynamic processes evaluation are presented. Also discuss the results of experiments of creating periodic inhomogeneities of the absorption coefficient of color centers and the gain in mixed crystals with the fluorite structure CaF2-LuF3, doped Ce3+ and Yb3+.

LTuK41
Spectroscopic Properties of UV Active Media Ce3+:LiCa1-xSrxAlF6, A. A. Shavelev, A. S. Nizamutdinov, V. V. Semashko, M. A. Marisov, *Kazan Federal Univ., Russia.* Optical absorption spectroscopy studies have shown that mixed crystals Ce3+:LiCa0,2Sr0,8AlF6 grown by Bridgeman technique exhibit more than 3 times higher absorption coefficient compared to Ce3+:LiCaAlF6 sample. An important result is based on the fact that this enhancement was achieved for two types of Ce3+ centers in a multisite Ce:LiSr0.8Ca0.2AlF6 system.

LTuK42
Photodynamic processes vs lasing in Ce,Yb:LiYXLu1-XF4 crystals, L.A. Nurtdinova, S.L. Korableva, *Kazan Federal Univ., Russia*. Ce-doped fluoride crystals are promising active media for tunable solid-state UV lasers. Photoconductivity measurement, numerical modeling and laser test results in UV spectral range for Ce,Yb:LiYXLu1-XF4 (x = 0..1) crystals are presented

LTuK43
The Use of Laser Technology for Creation of Straw Type Ionizing Radiation Detectors, L.E. Batay, N.A. Bosak, A.N. Chumakov, N.A. Kuchinskiy, N.P. Kravchuk, *B.I. Stepanov Inst. of Physics of National Academy of Sciences of Belarus, Belarus.* Laser technology based on high frequency laser ablation of metal from a cathode surface can be effectively applied for manufacturing straw detectors of ionizing radiation with excellent characteristics.

LTuK44
Effect of Spectrum Condensation in a Two-Isotope Gas Laser, A. V. Gusev, T. V. Radina, *St. Petersburg State Univ., Russia.* Generation of a single-mode gas laser with intracavity absorbing cell is investigated. The usage of a mixture of two isotopes with a large isotopic shift as the active medium leads to a significant increase in contrast of the inverted Lamb dip.

LTuK45
Lighting and hygienic aspects of application of light emitting diode sources, V. Lapina,

S. Trofimov, P. Zak, P. Pershukevich, T. Pavich, N. Trofimova, Yu. Tsaplev, *Inst. of Physics of NAS Belarus, Belarus.* In our work lighting and hygienic aspects of light emitting diodes (LED) illumination have been analyzed. There were analyzed powerful white light diodes and methods of white light formation, light-technical and light-hygienic advantages and disadvantages of light diode systems of illumination. New approaches to optimization of LED systems operation were estimated.

LTuK46
Spectroscopic investigation of Sm3+:KY(WO4)2 crystal, M.P. Demesh, O.P. Dernovich, N.V. Gusakova, A.S. Yasukevich, N.V. Kuleshov, A.A. Pavlyuk, A.A. Kornienko, E.B. Dunina, *Center for Optical Materials and Technologies, Belarusian National Technical Univ., Belarus*. Polarized absorption and stimulated emission cross sections spectra of Sm3+:KY(WO4)2 crystal have been determined. Calculations of spectroscopic parameters by the modified Judd-Ofelt method were performed.

LTuK47
Laser Beam Stabilization in the CNC Machines, Yuri Fedosov, Maxim Afanasiev, Alexander Trifanov, *Univ. ITMO, Russia.* Model and patent for laser CNC tool are analyzed. New optical stabilizing system utilizing modified Stewart platform is proposed. Mathematical model and features of controlling this system are examined. Band of allowed parameters is estimated.

LTuK48
Temperature Measurement of Laser Materials with Probe Piezoelectric Crystals, A.E. Korolkov, O.A. Ryabushkin, A.V. Konyashkin, *Moscow Inst. of Physics and Technology, Russia*. Novel method of low optical absorption coefficient measurement is introduced. It is based on laser calorimetry and piezoelectric resonance impedance spectroscopy.

LTuK49
Energy Transfer in Tm,Ho:KY(WO4)2 Crystals with Different Doping Levels, S.V. Kurilchik, A.S. Yasukevich, N.V. Gusakova, N.V. Kuleshov, *Belarusian National Technical Univ./ Center for Optical Materials and Technologies, Belarus.* Energy transfer parameters for Tm,Ho:KY(WO4)2 crystal were evaluated by measuring fluorescence dynamics of Tm3+ and Ho3+ ions in the samples with different dopants concentrations and fitting by the numerical solutions of rate equations.

LTuK50
Optical Unit for Technological Equipment, M. Afanasiev, G. Romanova, Y. Fedosov, *ITMO Univ., Russia.* The optical unit design for transmitting power laser radiation through an optical fiber is considered. A simple construction unit with minimized reflection losses design is overviewed. The general functioning scheme and designing features are presented.

LTuK51
Methods to Optimize the Moving Trajectory During Laser Processing, Y. Fedosov, M. Afanasiev, S. Akimov, *ITMO Univ., Russia.* Optimization of the moving trajectory of the terminating device during laser processing of irregular shapes is considered. Terminator trajectory is represented as nodes, forming a processing trajectory. To reduce the number of auxiliary paths, a genetic algorithm is proposed.

LTuK52
Bend Sensor Based on a Section of Double-Cladding Optical Fiber and Two Wavelengths Interrogation, O. V. Ivanov, S.V. Vasin, *Ulyanovsk Branch of Kotel'nikov Inst. of Radio Engineering and Electronics of RAS, Russia.* A fiber-optic bend sensor system based on a section of a double-clad fiber with depressed inner cladding interrogated with two wavelengths is investigated. The sensitivity of the sensor to the bend curvature is measured. The sensor characteristics are measured.

LTuK53
Multichannel fiber-optical sensory system for detecting weak acoustic fields, R. Romashko, M. Bezruk, S. Ermolaev, D. Storozhenko, Y. Kulchin, *Inst. of Automation and Control Processes FE RAS, Russia.* Multichannel fiber-optical sensory system for detecting weak acoustic fields in solids is developed and studied. The system is based on 32-channel adaptive interferometer with dynamic holograms multiplexed in a single photorefractive crystal CdTe. Developed sensory system allows real-time reconstruction the spatial distribution of the acoustic field in solids.

LTuK54
Wide Temperature Range Diode Pumped Nd:YAG Laser Without Active Thermal Stabilization, A.E. Dormidonov, A.D. Savvin, E.S. Safronova, D.V. Shaulskii, *All-Russia Research Inst. of Automatics, Russia.* Wide temperature operation range (–50 to +50 °C) of a compact passive Q-sw monolithic Nd:YAG 1.06-µm laser was achieved by side pumping and the use of high-power diode stacks without active thermal stabilization. Output laser pulse parameters are stable in considered temperature range: energy value is 130 ± 10 mJ and pulse duration is 4.0 ± 0.5 ns (FWHM). The efficiency of optical conversion varies from 12 to 21 % depending on temperature. Pulse repetition rate can be varied from single shot up to 50 Hz.

LTuK55
Investigations of Capillary Polymer Terahertz Fibers, M.M. Nazarov, M.S. Kitai, V.I. Sokolov, K.A. Bzheumihov, Z.Ch. Margushev, A.B. Sotsky, A.V. Shilov, L.I. Sotskaya, A.M. Goncharenko, G.V. Sinitsyn, *State Institution of Higher Education "A.A. Kuleshov State Univ.", Republic of Belarus.* The hollow-core fiber for terahertz applications formed by one hexagonal ring of polypropylene capillaries is studied both theoretically and experimentally. It is shown that the fiber has a quasi-periodic transmission spectrum and can be single mode with transmission losses less than 1dB/m.

LTuK56
Mitigation of Thermal Distortions in Longitudinally Diode Pumped Laser Rods, I.A. Gorbunov, O.V. Kulagin, N.F. Andreev, *Inst. of Applied Physics RAS, Russia.* Thermal distortions and possibilities of their mitigation in diode end-pumped Nd:YAG laser amplifier are investigated both theoretically and experimentally. Ways of pump profile optimization are suggested to correct thermal aberrations. Calculation of output beam quality requires high-order aberration to be taken into account.

LTuK57
Analysis of Transmission Spectra of Double Cladding Fiber upon Etching, O.V. Ivanov, F. Tian, H. Du, *Ulyanovsk Branch of Kotel'nikov Inst. of Radio Engineering and Electronics of RAS, Russia.* We analyze response of a double cladding fiber-optic structure to etching. We measure transmission spectra of the structure with decreasing thickness of the second cladding and show that the resonance dips shift to shorter wavelengths.

LTuK58
Laser irradiation diffusion in flame of burning hydrocarbons and the effectiveness of metals remote cutting, S.V. Gvozdev, A.F. Glova, V.Yu. Dubrovsky, S.T. Durmanov, A.G. Krasyukov, A.Yu. Lysikov, G.V. Smirnov, V.M. Pleshkov, *Troitsk Inst. for Innovation and Fusion Research (JSC «SSC RF TRINITY"), Russia.* This paper describes some experiments of study the possibility of using laser for remote metals cutting at the emergency oil and gas borings. Measurements a means of radiation absorption coefficient for continuous fiber laser in case of propagation through the flame of burning oil.

LTuK59
Wavelength and temperature dependences of the optical anisotropy parameter of CaF2, BaF2 and SrF2 crystals, A. I. Yakovlev, I. L. Snetkov, O. V. Palashov, *Inst. of Applied Physics RAS, Russia.* We obtained temperature and wavelength dependences of the material constant - optical anisotropy parameter of CaF2, BaF2 and SrF2. The optimal orientation of the crystallographic axes in which depolarization vanishes was defined for each crystal.

LTuL • 18:30-20:30
Laser Remote Sensing and Tunable Diode Laser Spectroscopy (LAT-02): Posters

LTuL1
Reflection factors of mirrors for fiber optic sonar antenna, V.N. Sorokovikov, V.I. Pustovoy, *A.M. Prokhorov General Physics Inst., RAS, Russia.* In this work we obtain formulas allowing calculating the coefficients of the mirror reflection of fiber optic sensors and the separation between them in the fiber optical antenna with a time-multiplexed interferometric N sensors, as well as the calculations of the reflection coefficients of the mirrors and the energy balance for the antenna with 16 fiber optic sensors

LTuL2
Mach-Zehnder PLC sensor for measurement of refractive index changes in gas and liquid mediums, O.A. Podtelkina, V.V. Svetikov, N.A. Djuzhev, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The results of numerical simulations of a planar lightwave circuit (PLC) sensor based on Mach-Zehnder interferometer with low contrast SiO2 waveguides are presented. By the modeling method (BPM – Beam Propagation Method) was analyzed the sensitivity of the sensor to changes in refractive index of gas and liquid environments. The sensitivity of the sensor was analyzed for different geometries sensor windows and different polarization of the optical mode.

LTuL3
InAs/InAsSb/InAsSbP heterostructure for mesurement concentration of carbon dioxide and monoxide, D.M. Kabanau, Y.V. Lebiadok, Y.P. Yakovlev, *SSPA "Optics, Optoelectronics & Laser Technology", Belarus.* The results of modeling of luminescence and gain spectra of InAs/InAsSb/InAsSbP heterostructure and comparison it with experimental data are discussed. The band gap energy, interband optical transition matrix element, amplified luminescence loss coefficient were obtained.

LTuL4
Application of Green Upconversion Fluorescence in Er-Doped Germanate Glass for Temperature Measurement, Y.A. Varaksa, M.A. Khodasevich, V.A. Aseev, G.V. Sinitsyn, G.E. Malashkevich, K. Akinshau, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Temperature dependence of green upconversion fluorescence of an Er-doped germanate glass at 60-150°C is studied. The sensitivity of temperature measurement by means of fluorescence intensity ratio is shown to be comparable with other Er-doped optical materials.

LTuL5
Polarized fluorescence of carboxyfluorescein label conjugated with oligonucleotide, A. P. Blokhin, M.V. Kvach, V.A. Povedailo, V.V. Shmanai, D.L. Yakovlev, *B.I. Stepanov Inst.*

of Physics of NASB, Belarus. Rotational fluorescence depolarization of molecular systems, consist of covalently linked oligonucleotides and carboxyfluorescein, has been studied. Fluorescence anisotropy was measured for two nucleic acids depending on the temperature to the viscosity ratio in buffered solutions with different glycerol concentrations. It was shown that the experimental data can be satisfactorily explained within the diffusion model of an elongated molecular top with internal rotation. It was found that coefficients of internal rotational diffusion in all cases are 1.5 - 2 times higher than the corresponding coefficient for the rotation around the axis of the oligonucleotide.

LTuL6
Thermal quenching of luminescence of GaInAsSb and InAsSbP heterostructures, D.M. Kabanau, Y.V. Lebiadok, Y.P. Yakovlev, *SSPA 'Optics, Optoelectronics & Laser Technology', Republic of Belarus.* Thermal quenching of luminescence of GaInAsSb and AlGaAsSb based LEDs (1.7 – 4.3 μm) was investigated. The values of activation energy of non-radiative recombination centres for GaInAsSb structure is in the range 78-88 meV, for GaInAsSb – 14 meV.

LTuL7
Excitation of miniature photoacoustic cells by zero order Bessel beams, A.L. Ulasevich, A.A. Kouzmouk, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The possibility is experimentally demonstrated of using zero order Bessel beams to pump miniature photoacoustic (PA) resonance cells by the example of detecting the concentration of water vapors in gaseous nitrogen. The water vapor detection threshold per unit laser PA cell pump power was attained at a level of 1.1×10-4 g/m3.

LTuL8
Reference Channel with the Controlled Intensity for a Remote Gas Analyzer, V.A. Gorobets, B.F. Kuntsevich, I.N. Puchkovsky, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The new scheme of the reference channel of a remote gas analyzer has been offered and realized. Due to use of reflective elements with the low reflection factor the new scheme allows to receive full interception of laser radiation and to provide a linear operating mode of a photodetector.

LTuL9
New Approach to the Description of the Active-Pulse Vision Systems, B. F. Kuntsevich, V. P. Kabashnikov, V. A. Gorobets, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* A new approach is based on analyzing the temporal overlap of reflected laser pulse and strobe pulse in the receiver unit. The formulas to calculate the characteristic distances are obtained. The algorithms to determine distances to objects are proposed. The analytical dependences agree with the calculation results and experimental measurements.

LTuL10
Laser induced breakdown spectrometry for elemental analysis of high wear resistant coating produced by laser cladding, P.A. Sdvizhenskii, V.N. Lednev, M.Ya. Grishin, S.M. Pershin, M.N. Filippov, A.N. Fedorov, M.A. Davidov, R.S. Tretyakov, A.Ya. Staverty, *National Univ. of Science and Technology MISiS, Russia.* High wear resistant coating (tungsten carbide in nickel matrix) produced by coaxial laser cladding was studied by laser induced breakdown spectrometry. Major components (W, Cr, Ni, etc.) were profiled for different layers of coating.

LTuL11
Preliminary results of measurement of methane and carbon dioxide in the Archipelago New Earth and in Moscow Region by diode laser spectroscopy from the Aircraft-laboratory YAK-42D "ROSHYDROMET", A. Kuzmichev, A. Nadezhdinskii, Ya. Ponurovskiy, D. Stavrovskii, Y. Shapovalov, V. Zaslavskii, V. Khattatov, V. Galaktionov, *A.M. Prokhorov General Physics Inst., RAS, Moscow.* In accordance with the monitoring programm of the state of the environment program, approved by Roshydromet, in 2015-2016 held a regular monitoring of the atmosphere of the aircraft in order to study the possibility of identifying the results of the burning of associated gas flaring oil rigs located in the Khanty-Mansi Autonomous District, also in the field area Kalchinskoye oil Tyumen region and near the town of Berezniki, Perm region. In addition to the data on the distribution of the soot in the troposphere, it is necessary to obtain spatial and temporal profiles of methane and carbon dioxide for a full assessment of the extent of contamination. The report will present the results of determination of vertical profiles of methane and carbon dioxide concentrations, at wavelengths of 1.65 and 1.6 nm. The airborne laser diode spectrometer [1]. In addition, it will be presented comparing the results of measurements of the main greenhouse gases produced by a diode laser spectrometer domestic and foreign gas analyzers are also installed on board the aircraft research laboratory. Figure 1 is a schematic view of the aircraft of the experiment:

LTuM • 18:30-20:00
Ultra-Fast Diagnostics in Laser Research (LAT-03): Posters

LTuM1
Speeded up lifetime testing technique for streak tubes, A.Yu. Sokolov, P.I. Konovalov, M.P. Vikulin, *Dukhov Research Inst. of Automatics (VNIIA), Russian Federation.* Here presented the results of sensitivity variations during operational time of a streak tube. Sensitivity decrease can be characterized by an exponential function. Described speeded up testing technique and physical processes causing degradation of photocathode.

LTuM2
MCP PMT with high time response and linear output current for neutron time-of-flight detectors, A.S. Dolotov, P.I. Konovalov, R.I. Nurtdinov, M.P. Vikulin, *Dukhov Research Inst. of Automatics (VNIIA), Russian Federation.* A microchannel plate photomultiplier tube with a subnanosecond time response and a high linear output current has been developed. Photomultiplier is designed for detection of weak pulses of radiation in UV-, visible and nearer-IR ranges.

LTuM3
Femtosecond Interferometry as a Tool for Optimal Control of Ions Photofragmentation., M. V. Korolkov, K.-M. Weitzel, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The possibility to control of the ion photofragmentation process by means of varying of the time delay between two interfering femtosecond laser pulses with proper carrier envelope phases have been studied.

LTuM4
Numerical simulation of temperature dynamics in TiAlN thin films on Si subtsrate under nanosecond laser irradiation, G.D. Ivlev, O.R. Ludchik, E.I. Gatskevich, *Belarusian National Technical Univ., Belarus.* The description of the space-time evolution of the temperature has been carried out on the basis of numerical solution of thermal problem with regard to the experimental situation of ruby laser radiation effect on thin film system TiAlN/Si. The temperature regimes at which the changes in morphology of the thin film take place are determined.

LTuM5
Dynamics of nanopulsed laser annealing of thin film germanium, G.D. Ivlev, S.L. Prakopyev, E.I. Gatskevich, R.I. Batalov, R.M. Bayazitov, I.A. Faizrakhmanov, *Belarusian National Technical Univ., Belarus.* The laser-induced processes in heavily doped germanium films on semiconducting and insulating substrates have been studied by the methods of time – resolved reflectivity measurements. The numerical simulation of laser heating, melt and solidification was carried out.

LTuM6
Stabilization CEO of Kilohertz Solid-State Laser System for Attosecond Pulses Generation Experiments, A.V. Kirpichnikov, V.V. Petrov, G.V. Kuptsov, A.V. Laptev, V.A. Petrov, E.V. Pestryakov, V.I. Trunov, *Inst. of Laser Physics SB RAS, Russian Federation.* A carrier-envelope offset phase stabilization (CEO) system was developed and implemented. It is allowing one to achieve residual instability ~0.17 radian (rms) for the 30 fs-pulse. It is sufficient to generate attosecond pulses efficiently.

LTuM7
Processing of Fiber Optic Bragg Sensor Signal by Fiber Bragg Gratings Filters, O.V. Butov, A.A. Chertoriyskiy, O.V. Ivanov, A.M. Nizametdinov, V.L. Vesnin, *Ulyanovsk Branch of the Kotelnikov Inst. of Radioengineering and Electronics of RAS, Russian Federation.* A system of signal processing for the fiber optic Bragg sensor using two Bragg gratings filters is proposed. The structural scheme of this system is described. The results of experiment with registration of metal plate oscillations excited by the impact of bullet are shown.

LTuM8
Dynamics of Photoinduced Processes in Copper(II) Mixed Halides, P.K. Olshin, A.V. Povolotskiy, A.S. Mereshchenko, *Saint Petersburg State Univ., Russia.* Copper(II) tetrahalocomplexes were studied using steady-state absorption spectroscopy and nanosecond transient absorption spectroscopy. Mechanisms of the relaxation of LMCT-excited [CuCl4]2-, [CuBr4]2- and [CuClBr3]2- complexes were proposed. Temperature and concentration effects were also investigated.

Hall 1
ICONO-05/3

09:00-11:00
IWA • Nonlinear Space-Time Dynamics, Instabilities, and Patterns III (ICONO-05/3)
Leonid Melnikov, *Yuri Gagarin State Technical Univ. of Saratov, Russia, Chair*

IWA1 • 09:00-09:30 • INVITED
Laws of supercontinuum spectrum formation at filamentation in transparent dielectrics, S V Chekalin, V O Kompanets, A E Dormidonov, V P Kandidov, *Inst. of Spectroscopy RAS, Russia.* In the result of experimental and analytical investigation it is revealed that material dispersion and multiphoton order of photoionization determine main peculiarities of anti-Stokes supercontinuum band shift under filamentation of near- and mid-IR fs pulses at strong anomalous GVD in transparent dielectrics.

IWA2 • 09:30-10:00 • INVITED
Electromagnetic wave emission and efficient energy deposition into air during femtosecond filamentation, O.G. Kosareva, N.A. Panov, D.E. Shipilo, V.A. Andreeva, D.V. Pushkarev, D.S. Uryupina, A.B. Savel'ev, P.M. Solyankin, M.N. Esaulkov, A.P. Shkurinov, V.A. Makarov, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* Frequency–angular distribution of radiation down to 0.05 THz in a single filament and collision of multiple filaments with enhanced energy deposition into air are measured and simulated using 3D+time model with the carrier wave resolved

Hall 2
ICONO-07/3

09:00-10:45
IWB • Beyond Non-Linear Optics: High & Extreme Optical Field Physics III (ICONO-07/3)
Nikolay Andreev, *Joint Inst. for High Temperatures, RAS, Russia, Chair*

IWB1 • 09:00-09:30 • INVITED
Towards few cycle PW peak and kW average power Ti:sapphire laser systems, H.Cao, M.Kalashnikov, R.S. Nagymihaly , N. Khodakovskiy, K. Osvay and V.Chvykov, *ELI-ALPS, Hungary.* The experimental results of polarization encoded chirped pulse amplification and thin disk extraction during pumping technique are presented. The combination of them may pave the way to petawatt few cycle lasers with high average power.

IWB2 • 09:30-09:45 • ORAL
Picosecond contrast in Ti:sapphire CPA laser systems, M.Kalashnikov, N.Khodakovskiy, *Max-Born-Inst., Germany.* Recompressed pulses of Ti:Sa lasers are characterized by a post-pedestal with ragged temporal structure. It is coherent with the main pulse, is generated in pumpred Ti :Sa medium and generates a symmetric pre-pedestal.

Hall 3
ICONO-04/3

09:00-10:45
IWC • Nonlinear Optics and Novel Phenomena III (ICONO-04/3)
Christian Spielmann, *Inst. of Optics and Quantum Electronics, Abbe Center of Photonics, Friedrich-Schiller-Univ. Jena Helmholtz-Inst. Jena, Germany, Chair*

IWC1 • 09:00-09:45 • KEYNOTE
Exploring the attosecond frontier of condensed phase physics, E. Goulielmakis, *Max Planck Inst. of Quantum Optics, Germany.* I will discuss how modern advancements of the "ultrafast toolbox" allow for the first time, the exploration and control of fundamental electronic phenomena in condensed media. Electron motion in bulk media, driven by intense, precisely-sculpted, optical fields give rise to controllable electric currents, the frequency of which extends to the multi-Petahertz range9-10, advancing lightwave electronics10 to new realms of speed and precision.

Hall 4 LAT-04/1	Hall 5 LAT-01/7	Notes
09:00-11:00 LWA • Biophotonics and Laser Biomedicine (LAT-04/1) Victor Loshchenov, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*	09:00-11:00 LWB • Laser System and Materials (LAT-01/7) Thomas Südmeyer, *Laboratoire Temps-Fréquence, Université de Neuchâtel, Neuchâtel, Chair*	
LWA1 • 09:00-09:45 • KEYNOTE *On the estimation of tissue optical parameters from diffuse reflectance spectroscopy,* W. Blondel, P. Rakotomanga, M. Kholodtsova, C. Daul, V.B. Loschenov, M. Amouroux, C. Soussen, *Université de Lorraine, France.* This contribution is a state of the art overview on inverse problem solving for spatially resolved diffuse reflectance spectroscopy challenging the precise estimation of multi-layer biological tissue optical parameters.	LWB1 • 09:00-09:30 • INVITED *Spectroscopic and laser properties of Fe2+ doped Cd1-xMnxTe crystals at low temperature.,* M.E. Doroshenko, V.V. Osiko, H. Jelinkova, M. Jelinek, N.O. Kovalenko, A.S. Gerasimenko, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Spectroscopic and laser properties of Fe2+ doped Cd1-xMnxTe solid solutions in a wide range of Mn concentration x were investigated. First to our best knowledge lasing of Fe2+ ions in CdMnTe crystals at 77 K was demonstrated.	
	LWB2 • 09:30-09:45 • ORAL *Single crystal ZnSe:Fe2+ infrared luminescence with electron beam excitation,* A.A. Gladilin, V.P. Kalinushkin, N.N. Ilichev, V.P. Danilov, V.A. Chapnin, E.S. Gulyamova, P.P. Pashinin, A.V. Sidorin, M.V. Chukichev, R.R. Rezvanov, I.N. Odin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Cathodoluminescent spectral-kinetics parameters of monocrystal ZnSe:Fe2+ were studied. The present results correspond to optically exited IR-luminescent spectrum and kinetic of Fe2+ in ZnSe crystal. The findings offer the challenge of developing hot electrons excited Fe2+:ZnSe-laser.	

Hall 1 ICONO-05/3

09:00-11:00
IWA ● Nonlinear Space-Time Dynamics, Instabilities, and Patterns III (ICONO-05/3)—Continued

IWA3 • 10:00-10:15 • ORAL
Clustering elliptic Gaussian beam at the end of the atmospheric paths, E. A. Babanin, A.V. Blank, O.M. Vokhnik, V.V. Kapranov, I.S. Matsak, N.A. Suhareva, V.Y. Tuganeko, *Faculty of Physics, Lomonosov Moscow State Univ., S.P Korolev Rocket and Space Corporation "Energia", Russia.* The experimental realization of an optical system with tunable ABCD-matrix, allowing to manage spatial moments of paraxial beams at the end of extended atmospheric paths is presented. The spatial and temporal characteristics of the stochastic diffusion beam profile, dynamic clustering intensity as a function of the parameter Rytova are researched.

IWA4 • 10:15-10:30 • ORAL
Compressor of single-cycle optical pulses based on self-induced transparency soliton attraction, M.V. Arkhipov, I. Babushkin, N.N. Rosanov, *ITMO Univ., St. Petersburg State Univ., Russia.* We present a novel scheme of a single-cycle optical pulse compression using its propagation in the regime of self-induced transparency in dense coherent absorbing media. The pulse can be compressed to a subcycle unipolar one.

Hall 2 ICONO-07/3

09:00-10:45
IWB ● Beyond Non-Linear Optics: High & Extreme Optical Field Physics III (ICONO-07/3)—Continued

IWB3 • 09:45-10:00 • ORAL
Source of ultrafast dual-energy X-rays based on femtosecond laser excitation of mixed clusters and compound solids, I.A. Zhvaniya, M.S. Dzhidzhoev, A.A. Garmatina, V.M. Gordienko, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* Generation of two-colored ultrafast X-rays in energy range of 2-15 keV from laser-induced plasma is discussed. As a target we proposed to use solids that consist of atoms with appropriate K-energy transitions or jet of mixed nanoclusters.

IWB4 • 10:00-10:15 • ORAL
Multistage coherent beams combining for extreme field generation, V.I. Trunov, S.A. Frolov, E.V. Pestryakov, S.N. Bagayev, *Inst. if Laser Physics SB RAS, Russia.* The features of the scheme for achieving ultrahigh intensities using three stages of coherent beam combining: multibeam pumping of parametric amplifiers, multibeam SHG for higher pump pulse energy, coherent combining of amplified pulses are discussed

IWB5 • 10:15-10-30 • ORAL
Simulations of tight focusing by propagation equations, D. E. Shipilo, N. A. Panov, V. A. Andreeva, V. Jukna, V. V. Bukin, A. Couairon, O. G. Kosareva, F. Nesa, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* Propagation equations with input conditions in a form of a beam with parabolic phase are shown to provide reliable results for f-numbers down to critical value. For smaller f-numbers, the suitable input conditions are proposed.

Hall 3 ICONO-04/3

09:00-10:45
IWC ● Nonlinear Optics and Novel Phenomena III (ICONO-04/3)—Continued

IWC2 • 09:45-10:00 • ORAL
Linear and circularly polarized XUV- supercontinuum, D. Brambilla, A. Husakov, M. Ivanov and N. Zhavoronkov, *Max-Born-Insitute, Germany.* New aspects for generation of XUV radiation by application of few-cycle laser pulses and pulses with tailored polarisation is presented. We demonstrate the ability to encode a small amount of pulse's phase from the harmonics spectra and the generation of circularly polarised harmonics with the fully tunable ellipticity.

IWC3 • 10:00-10:15 • ORAL
Filamentation dynamics and pulse compression of high-peak-power mid-infrared laser pulses, A.V. Mitrofanov, A.A. Voronin, S.I. Mitryukovsky, M.V. Rozhko, E.E. Serebryannikov, D.A. Sidorov-Biryukov, A.B. Fedotov, A. Pugzlys, V.Ya. Panchenko, A. Baltuska, A.M. Zheltikov, *Russian Quantum Center Crystallography and Photonics Federal Research Center, Russia.* Filamentation-assisted pulse compression technique for high power mid-infrared pulses is presented. Careful choice of gas pressure and input pulse parameters is shown to enable the generation of 35 fs duration pulses at a central wavelength of 4 mkm reaching peak powers as high as 0.3 TW.

IWC4 • 10:15-10:30 • ORAL
Wideband ultrasonic study of femtosecond filaments, D. Pushkarev, A. Bychkov, D. Uryupina, N. Panov, E. Mitina, E. Cherepenina, A. Karabutov, O. Kosareva, A. Savel'ev, *Lomonosov Moscow State Univ., Russia.* New opportunities in ultrasound diagnostics of femtosecond laser filaments with a wideband piezoelectric transducers are considered. Transverse spatial resolution better than 100 microns is demonstrated in the single and regular multiple filamentation regime.

Hall 4 LAT-04/1	Hall 5 LAT-01/7	Notes
09:00-11:00 LWA • Biophotonics and Laser Biomedicine (LAT-04/1)—Continued	09:00-11:00 LWB • Laser System and Materials (LAT-01/7)—Continued	
LWA2 • 09:45-10:15 • INVITED *NEAR INFRARED IMAGING FOR ANGIOGRAPHY IN DIABETIC FOOT,* Z. N. Abdulvapova, P.V. Grachev, O.N. Bondarenko, G.R. Galstyan, *Endocrinology Research Centre, Russia.* Current Modern methods for lower limb ischemia (LLI) assessment have a number of limitations in the use in diabetic patients.. Indocyanine green (ICG) fluorescence angiography (ICGA) is a new technique in assessing the perfusion disturbance in LLI.	LWB3 • 09:45-10:00 • ORAL *Terbium Aluminum Garnet Ceramics with Different Dopants for Faraday Isolators for High-power Radiation,* A. Starobor, O. Palashov, *Inst. of Applied Physics RAS, Russia.* Thermooptical and magnetooptical properties of terbium aluminum garnet ceramics doped with titanium, silicon and cerium were studied. They are more than 1.5-times better at maximum radiation power than TGG ceramics as medium for Faraday isolators.	
	LWB4 • 10:00-10:15 • ORAL *Efficient IR, UV and VUV lasers pumped by run-away electron preionized discharge,* A.N. Panchenko, N.A. Panchenko, D.A. Sorokin, M.I. Lomaev, A.I. Suslov, *Inst. of High Current Electronics SB RAS, Russia.* New technique of gas laser excitation based on run-away electron preionized diffuse discharges (REP DD) was suggested and realized. Efficient lasing in the IR, UV and VUV spectral ranges under REP DD pumping was demonstrated	
LWA3 • 10:15-10:45 • INVITED *Coherent optical methods in biomedical diagnostics* Jurgen Schreiber, *Fraunhofer IKTS-MD, Germany*	LWB5 • 10:15-10:30 • ORAL *Amlification Gain Spectrum Control in Anisotropic Neodymium Doped Laser Crystals,* G.V. Shilova, P.G. Zverev, A.A. Sirotkin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The polarization dependencies of Nd3+ ions fluorescence bands in YLiF4, YAlO3, SrWO4, YVO4 and mixed Y0.3Gd0.7VO4 anisotropic crystals at 1040-1080 nm were investigated. The crystals orientation for simultaneous dual wavelength oscillation was proposed.	

Hall 1
ICONO-05/3

09:00-11:00
IWA • Nonlinear Space-Time Dynamics, Instabilities, and Patterns III (ICONO-05/3)—Continued

IWA5 • 10:30-10:45 • ORAL
Generation of rectangular unipolar videopulses in Raman-active medium excited by few-cycle light pulses, A. V. Pakhomov, R. M. Arkhipov, M. V. Arkhipov, Yu. A. Tolmachev, I. Babushkin, and N. N. Rosanov, *Department of Physics, Samara Univ.. Department of Theoretical Physics, Lebedev Physical Inst.., Russia.* We consider a new possibility of unipolar videopulse generation in a Raman-active medium excited by extremely short light pulses. Different medium geometrical configurations are studied and multifold possibilities for the resulting pulse shaping are demonstrated.

IWA6 • 10:45-11:00 • ORAL
Control and optimization of DCl^+ ion photodissociation dynamics by femtosecond laser pulses, M.V. Korolkov, K.-M. Weitzel, *Stepanov Inst. of Physics, NASB, Belarus.* Nonlinear space-time dynamics of photodissociation process has been investigated by means of computer simulation within the Schrödinger wavefunction formalism. We demonstrate the possibility of effective control of product yields by appropriate choice of laser parameters.

Hall 2
ICONO-07/3

09:00-10:45
IWB • Beyond Non-Linear Optics: High & Extreme Optical Field Physics III (ICONO-07/3)—Continued

IWB6 • 10:30-10:45 • ORAL
Guiding femtosecond laser pulses by copper capillaries for laser-driven plasma wakefield acceleration, K.V. Lotov, V.I. Trunov, K.V. Gubin, E.V. Pestryakov, R.I. Spitsyn, P.V. Tuev, S.N. Bagayev, P.V. Logachev, *Budker Inst. of Nuclear Physics SB RAS, Russia.* Transmission of 50fs laser pulses through 20-mm-long, 50μm wide copper capillaries is measured to be 70% for intensities up to 10^{17}W/cm^2, but reduces after hundreds of shots because of solid plug formation inside the capillary.

IWB7 • 10:45-11:15 •INVITED

Ion Acceleration with PW-Ultrashort laser pulse: Perspectives for applications Ter-Avetisyan *1Center for Relativistic Laser Science, Institute of Basic Science IBS), Gwangju, Korea 2 Department of Physics and Photon Science, Gwangju Institute of Science and Technology(GIST), Gwangju, Korea*
Recent experimental findings on ion acceleration using 1.5PW laser will be discussed.Newly found scenario offers favorable proton energy scaling with laser intensity. The latter are essential for potential applications of laser driven ion beams.

Hall 3
ICONO-04/3

09:00-10:45
IWC • Nonlinear Optics and Novel Phenomena III (ICONO-04/3)—Continued

IWC5 • 10:30-10:45 • ORAL
Polarization of THz radiation from plasma filament induced by two-color arbitrary polarized laser pulse, N.A. Panov, M.N. Esaulkov, V.A. Andreeva, P.M. Solyankin, D.E. Shipilo, V.V. Bukin, V.A. Makarov, A.P. Shkurinov, O.G. Kosareva, S.L. Chin, *Lomonosov Moscow State Univ., Russia.* We reveal that polarization of THz radiation from two-color femtosecond pulse is predominantly defined by transient photocurrent and remains stable with the change of the initial polarization angle between the 800 and 400 nm fields.

Hall 4 LAT-04/1	Hall 5 LAT-01/7	Notes
09:00-11:15 LWA • Biophotonics and Laser Biomedicine (LAT-04/1)—Continued	09:00-11:00 LWB • Laser System and Materials (LAT-01/7)—Continued	
	LWB6 • 10:30-10:45 • ORAL *The shear lift force acting on microparticles actuated by magneto-optical tweezers,* M.N. Romodina, N. M. Shchelkunov, E. V. Lyubin, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* The shear lift force on a microparticle manipulated and actuated by magneto-optical tweezers is studied. The force is explained in terms of thermophoretic forces acting on microparticle due to non-uniform distribution of liquid's temperature.	
LWA4 • 10:45-11:00 • ORAL *Spectral-Temporal Pulse Construction for Optimal Nonlinear Raman Brain Imaging,* E.A. Stepanov, A.A. Lanin, D.A. Sidorov-Biryukov, A.B. Fedotov, A.M. Zheltikov, *International Laser Center & Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We propose efficient strategies of pulse-width optimization applicable for nonlinear Raman brain imaging. Ultrashort laser pulses with the spectral bandwidth, accurately matched against the bandwidth of molecular vibrations, are shown to provide a higher power of the total signal without reducing the sensitivity of tumor detection in brain tissues.	LWB7 • 10:45-11:00 • ORAL *Optical manipulation of RBC in laser tweezers,* S.H. Abdulrazak, Y.V. Rozhdestvensky, *ITMO Univ., Russia.* We present in this article calculations of forces appliing to RBC traped in opticle tweezers. To do so we used Fresnel equations only and ray optics to find values of forces effecting biological object.	
LWA5 • 11:00-11:15 • ORAL *Near-IR Laser Heating of Rare-Earth Doped Composite Nanoparticle Colloids,* I.R. Romanishkin, Y.V. Orlovskii, I.A. Burmistrov, D.V. Pominova, A.S. Vanetsev, E.O. Orlovskaya, A.V. Ryabova, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Hyperthermia is a potent method of cancer treatment. In this study we investigated the spatial heating effect of composite DyPO4-covered nanogold and Nd3+-doped LaF3 nanoparticles under continuous-wave and repeating-pulse laser excitation. The results showed higher laser-to-temperature conversion effectiveness for nanoparticles with gold core.		

Big Hall
PLENARY SESSION II

11:30-13:30
PWB ● Plenary Session II
Chair to be announced.

PWB1 • 11:30-12:10 • PLENARY
Metamaterials in optical spectral region: technologies, properties and perspectives of application, V.N. Belyi, *B.I.Stepanov Inst. of Physics of NASB, Belarus*. "The past ten years have seen the emergence of metamaterials in optical spectral region characterized by extraordinary properties. Their ability to manipulate parameters of light radiation in new ways has led to many novel applications. Examples include super resolution imaging, negative refraction, optical cloaking, enhance nonlinear interaction and others.

The state of affairs have been analyzed in theory of propagation and transformation of light fields (amplitude, polarization, directivity) in optical metamaterials having different structures and technologies of fabrication and possessing the potential for broadband manipulation of the density of photonic states and subwavelight confinement. A special attention is devoted to the appearance of a number of novel effects in optical metamaterials with extreme parameters (particularly, in metamaterials with close to zero dielectric permittivity (ENZ-materials)): tunneling through super narrow channel, formation of narrowband light beams, amplifying of optical nonlinearities. Also there have been analyzed the properties of a new class of metamaterials with extremely high optical anisotropy, which are perspective, for example, for creation of plasmonic, deep subwavelength bulk waveguides.

There have been investigated the peculiarities of excitation and properties of new types of plasmon-polaritons, so called Bessel, single and multiplasmons possessing the property of quasinondiffraction. Particularly, singular radiative plasmon-polariton in ENZ optical materials has been predicted.

On the basis of the fabricated hyperbolic metamaterials there have been proposed and realized new configurations of flat lenses (so called superlenses) of near and far field in a spectral region from ultraviolet up to infrared radiation. The developed superlenses of near field provide spatial resolution below the diffraction limit and allow achieving high local amplification of intensity (for example, at the wavelength of $\lambda = 365$ nm the resolution is $\lambda/5$ and the amplification is 30). There has been determined and proved experimentally the light focusing criterion, namely, the presence of negative curvature of flat lens phase characteristic. For the first time it has been established that for the incident on a superlens light filed with radial polarization the regime of focusing is realized and with the azimuthal polarization – regime of channeling, i.e. the formation of narrow nondivergent light beam. New ways have been proposed of application of near-field lens for formation of two-scale light field, for resonance-amplified nanolithography and so on.

The methods are discussed of fabrication and investigation of new types of optical metamaterials based on the use of i) nanoporous dielectric matrices with pores filled with metal; ii) nanosized metal-dielectric structures, iii) self-assembled and oriented metal nanoparticles. A special attention is devoted to fish-net metamaterials possessing optical magnetism and having two- and three-dimension structures with centimeter sizes. There are presented the results of the investigation of metamaterials obtained using the mentioned above technologies. New methods are developed and devices are created for characterization of optical properties of metamaterials.

It seems probable that over the next years optical metamaterials will continue to yield many fundamental results with potential for practical application.

PWB2 • 12:10-12:50 • PLENARY
On some problems of laser interferometers for the direct detection of gravitational waves, V. Pustovoit, *Scientific and Technological Ctr. of Unique Instrumentation, Russia.*
Contents of the report:

1.Metody assessment of observed events.

2.About the problem of the creation of mirrors with high reflectivity and radiation resistance.

3.Geterogennye environment (metamaterials) to create highly reflective laser mirrors.

PWB3 • 12:50-13:30 • PLENARY
Lasers in modern refractive surgery, S. Vartapetov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Motivated and driven by numerous applications and long-standing challenges in strong-field physics, molecular spectroscopy, semiconductor electronics, and standoff detection, ultrafast optical science is rapidly expanding toward longer wavelengths. Recent experiments reveal unique properties of filaments induced by ultrashort laser pulses in the mid-infrared, where the generation of powerful supercontinuum radiation is accompanied by unusual scenarios of optical harmonic generation, giving rise to remarkably broad radiation spectra, stretching from the visible to the mid-infrared. Generation of few- and even single-cycle mid-infrared field waveforms with peak powers ranging from a few megawatts to hundreds of gigawatts has been demonstrated within a broad range of central wavelengths. Below-the-bandgap high-order harmonics generated by ultrashort mid-infrared laser pulses are shown to be ideally suited to probe the nonlinearities of electron bands, enabling an all-optical mapping of the electron band structure in bulk solids. This lecture will provide an overview of exciting new physics behind the recent achievements in this rapidly growing area of ultrafast optical science.

Hall 1
ICONO-05/4

15:00-16:45
IWD • Nonlinear Space-Time Dynamics, Instabilities, and Patterns IV (ICONO-05/4)
Sergey Chekalin, *Inst. of Spectroscopy, RAS, Russia, Chair*

IWD1 • 15:00-15:30 • INVITED
Coherent dynamics of nanowire lasers, B. Lingnau, B. Mayer, A. Regler, S. Sterzl, T. Stettner, G. Koblmüller, M. Kaniber, K. Lüdge, J. J. Finley, *Inst. of Theoretical Physics, Technische Universität Berlin, Germany.* We demonstrate that GaAs-AlGaAs nanowire lasers can emit pairs of coherent picosecond laser pulses under incoherent pulsed optical excitation. The physical mechanism is shown to be the storage of the coherent optical phase information by the microscopic polarization.

IWD2 • 15:30-15:45 • ORAL
Vector model of ultra short pulse Er-doped ring cavity bi-directional fiber laser with inhomogeneous broadening , L.A. Melnikov, M.V. Ryabinina, *Yuri Gagarin State Technical Univ. of Saratov, Russia.* Numerical vector model of Er-doped fiber laser is revisited and new methods for calculations of polarization phenomena, influence of inhomogeneous broadening and interaction of oppositely running pulses are proposed and realized

Hall 2
ICONO-07/4

15:00-16:30
IWE • Beyond Non-Linear Optics: High & Extreme Optical Field Physics IV (ICONO-07/4)
Alexander Pukhov, *Inst. for Theoretical Physics I, Univ. of Dusseldorf, Germany, Chair*

IWE1 • 15:00-15:30 • INVITED
High energy electrons in the relativistic laser-matter interactions, N.E. Andreev, *Joint Inst. for High Temperatures, RAS, Russia.* Different mechanisms of laser-plasma electron acceleration are discussed in view of current and future experiments. Laser wakefield acceleration of short electron bunches to multi-GeV energies with small emittance and energy spread is modelled and analyzed.

IWE2 • 15:30-16:00 • INVITED
Laboratory investigation of magnetized laser plasmas expansion into the vacuum, A. Soloviev, K. Burdonov, S. N. Chen, A. Eremeev, G. Revet, S. Pikuz, E. Filippov, M. Cerchez, T. Gangly, A. Sladkov, A. Korzhimanov, V. Ginzburg, E. Khazanov, A. Kochetkov, A. Kuzmin, I. Shaykin, A. Shaykin, I. Yakovlev, M. Starodubtsev, and J. Fuchs, *Inst. of Applied Physics, RAS, Russia.* Experimental studies on laser-plasma expansion into an ambient magnetic field are performed in order to model different astrophysical objects, such as astrophysical jets and accretion discs in the vicinity of young star objects.

Hall 3
ICONO-04/4

15:00-16:30
IWF • Nonlinear Optics and Novel Phenomena IV (ICONO-04/4)
Eleftherios Goulielmakis, *Max Planck Inst. of Quantum Optics, Germany, Chair*

IWF1 • 15:00-15:30 • INVITED
Supercontinuum generation in gas-filled anti-resonant hollow-core fibers, R. Sollapur, D. Kartashov, M. Zürch, A. Hoffmann, A. Hartung, M. Schmidt, C. Spielmann, *Inst. of Optics and Quantum Electronics, Abbe Center of Photonics, Friedrich-Schiller-Univ. Jena Helmholtz-Inst. Jena, Germany.* We report on multioctave broadband supercontinuum generation from ultraviolet to near infrared wavelengths in the fundamental mode using a gas-filled novel low-loss anti-resonant hollow-core fiber, which is in excellent agreement with our simulations.

IWF2 • 15:30-15:45 • ORAL
Quasi-phase-matched Raman-Nath nonlinear diffraction in 2D nonlinear photonic crystals, A. M. Vyunishev, V. G. Arkhipkin, I. S. Baturin, A. R. Akhmatkhanov, V. YA. Shur, and A. S. Chirkin, *L.V. Kirensky Inst. of Physics SB RAS, Russia.* Second harmonic generation under Raman-Nath nonlinear diffraction (RNND) in two-dimensional nonlinear photonic crystals is systematically studied. Different structures are discussed for enhancement of RNND effect. Experimental data confirm the validity of the theoretical model.

Hall 4 LAT-04/2	Hall 5 LAT-03/3	Notes
15:00-16:45 LWC • Biophotonics and Laser Biomedicine (LAT-04/2) Rudolf W. Steiner, *Institut für Lasertechnologien in der Medizin und Messtechnik an der Universität Ulm, Germany, Chair*	15:00-16:45 LWD • Ultra-Fast Diagnostics in Laser Research (LAT-03/3) Sergei Tikhomirov, *Department of Physics, Mathematics and Informatics of NAS of Belarus, Belarus, Chair*	
LWC1 • 15:00-15:30 • INVITED *Combined Spectroscopic Technique in Low-grade Glioma Neurosurgery Navigation,* T.A. Savelieva, A.A. Goryainov, A.A. Potapov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The method for the simultaneous in vivo analysis of fluorescence, scattering and absorption of brain tissues in adjacent spectral ranges from 500 to 800 nm is proposed.	LWD1 • 15:00-15:30 • INVITED *Pico-Femtosecond Image-Tube Instrumentation in Experimental Physics*, M.Ya. Schelev, K.A. Vereshchagin, *A.M. Prokhorov General Physics Inst., RAS, Russian Federation.* Analyzed are more than a half-century research experiences in the field of design and application the pico-femtosecond image-tube technologies intended for ultrafast phenomena recording in experimental physics.	
LWC2 • 15:30-16:00 • INVITED *The Development of methods for fluorescence imaging in theranostics oncological disease,* E.V. Filonenko, A.D. Kaprin, A.N. Urlova, M.V. Loschenov, *National Medical Research Radiological Centre of the Ministry of Health of RF, Russia.* In the presented work we have described main methods for fluorescence imaging in theranostics oncological disease, which are as follows: visually assessed fluorescence diagnosis, fluorescence spectroscopy and fluorescence navigation.	LWD2 • 15:30-15:45 • ORAL *New generation of streak tubes producing by VNIIA,* P.I. Konovalov, A.Yu. Sokolov, R.I. Nurtdinov, M.P. Vikulin, I.G. Pryanishnikov, A.S. Dolotov, *Dukhov Research Inst. of Automatics (VNIIA), Russian Federation.* The new generation streak tubes have smaller weight and dimensions and outperform their predecessors in almost all features, including time resolution, dynamic range and life time.	

Hall 1
ICONO-05/4

15:00-16:45
IWD • Nonlinear Space-Time Dynamics, Instabilities, and Patterns IV (ICONO-05/4)—Continued

IWD3 • 15:45-16:00 • ORAL
Coherent photonics devices -- a novel type of nonlinear photonics devices based on coherent light-matter interactions, R.M. Arkhipov, M.V. Arkhipov, I. Babushkin, N.N. Rosanov, *ITMO Univ., St. Petersburg State Univ., Russia.* We present examples of coherent photonics devices – a novel type of nonlinear photonics devices based on coherent light-matter interactions. Among them are self-induced transparency passive mode-locked laser and ultra-fast laser beam deflector.

IWD4 • 16:00-16:15 • ORAL
Topological charge conservation of optical vortices with topological charge l = 1/2 in second harmonic generation process, P. Stanislovaitis, A. Matijošius, V. Smilgevičius, M. Ivanov, *Laser research center, Vilnius Univ., Lithuania.* We investigate the conservation of topological charge in second harmonic generation process, pumped by fractional-charge optical vortices. We show that the topological charge is conserved despite the decay of optical vortex core.

IWD5 • 16:15-16:30 • ORAL
Parametric amplification with backward waves: Pulse shapes, V.V. Slabko, V.A. Tkachenko, A.K. Popov, and S.A. Myslivets, *Birck Nanotechnology Center, Purdue Univ., USA.* Unparalleled properties of the phase-matched optical parametric amplification in the pulsed regimes are investigated in a coupling schemes with contra-propagating idler. They manifest themselves in unusual dependence of the output pulse shapes on the input parameters.

IWD6 • 16:30-16:45 • ORAL
Optical scheme for generation of two-scaled surface plasmons, V. Belyi, N. Kazak, N. Khilo, *Stepanov Inst. of Physics, NASB, Belarus.* The optical scheme is proposed and calculated for generation of resonance surface plasmons in a layered metal-dielectric structure. Such plasmons are micro-scaled in layer plane and nano-scaled in perpendicular plane. The particular case of generation of Airy-type plasmons is studied.

Hall 2
ICONO-07/4

15:00-16:30
IWE • Beyond Non-Linear Optics: High & Extreme Optical Field Physics IV (ICONO-07/4)—Continued

IWE3 • 16:00-16:15 • ORAL
Relativistic laser-plasma interactions in the case of the long pre-plasma layer: Experimental study, S.A. Shulyapov, I.N. Tsymbalov, D.A. Krestovskih, K.A. Ivanov, R.V. Volkov, A.B. Savel'ev, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* We present the results of the experimental studies (optical and gamma-ray diagnostics, shadowgraphy and interferometry) of the abnormally hot electron generation mechanisms in the case of long scale pre-plasma layer subcritical density.

IWE4 • 16:15-16:30 • ORAL
Mechanisms of hot electrons generation and optical harmonics emission at relativistic laser-plasma interaction, I.N. Tsymbalov, S.A. Shulyapov, K.A. Ivanov, P.A. Ksenofontov, A.V. Brantov, V.Yu. Bychenkov, A.B. Savel'ev, *Faculty of Physics, International Laser Center, Lomonosov Moscow State Univ., Russia.* We present PIC simulations of the ultrashort powerful laser energy absorption in the case of long scale length subcritical pre-plasma.

Hall 3
ICONO-04/4

15:00-16:30
IWF • Nonlinear Optics and Novel Phenomena IV (ICONO-04/4)—Continued

IWF3 • 15:45-16:00 • ORAL
Giant magnetic-field-induced enhancement of third harmonic generation in GaAs, V. V. Pavlov, W. Warkentin, D. Brunne, D. R. Yakovlev, A. V. Rodina, R. V. Pisarev, M. Bayer, *Ioffe Inst., RAS, Russia.* It is found that an external magnetic field of 10 T gives rise to a giant enhancement of the THG intensity by a factor of hundred. This phenomenon is attributed to the intricate modification of exciton-polaritons in magnetic field caused by mixing of dark and bright 1s-exciton states in GaAs.

IWF4 • 16:00-16:15 • ORAL
Dynamics of dipolaritonic optical parametric oscillator, P. I. Khadzhi, O. F. Vasilieva, I.V. Belousov, *Taras Shevchenko Transnistria State Univ., Moldova.* The dynamics of dipolariton states in a planar microcavity under pumping of the state corresponding to the intermediate dipolariton branch has been studied. Aperiodic conversion of pump dipolaritons into dipolaritons of idler and signal modes is shown to occur under exact-resonance conditions

IWF5 • 16:15-16:30 • ORAL
Modelling highly-dispersive transparency in planar nonlinear metamaterials by high-order finite element method, N.N. Potravkin, K.S. Grigoriev, V.A. Makarov, I.A. Perezhogin, *International Laser Center, Lomonosov Moscow State Univ., Russia.* We propose a new low-cost approach for description of nonlinear light self-action, and demonstrate its efficiency in a problem of light propagation in highly-dispersive (in optical range) planar metamaterial consisting of two silver strips. Owing to plasmonic resonances in such a structure, which result in strong amplification of local field, it is possible to achieve high sensitivity of the transmission coefficient to the intensity of incident monochromatic wave.

Hall 4 LAT-04/2	Hall 5 LAT-03/3	Notes
15:00-16:45 LWC • Biophotonics and Laser Biomedicine (LAT-04/2)—Continued	15:00-16:45 LWD • Ultra-Fast Diagnostics in Laser Research (LAT-03/3)—Continued	
	LWD3 • 15:45-16:15 • INVITED *Lasers and streak-cameras at physics of accelerators,* O.I. Meshkov, *G. I. Budker Inst. of Nuclear Physics of SB RAS, Russia.* Ultra-relativistic beams of particles in modern linear and cyclic accelerators have a typical spatial longitudinal dimension between tenths of a millimeter up to tens of millimeters. This value needs of a constant monitoring. It means a necessity of measurement of time intervals lasting from ten to tens of picoseconds with an accuracy of a few percent. In recent years, along with the application for these purpose streak cameras, the methods of particle beam diagnostic based on the application of laser radiation are widely used. Lasers are applied for precise measurements of geometric dimensions and the energy of the beams as well as for generation of intense X-ray fluxes. Laser scattering is able to vary an energy spread of the particles in a beam. The report reviews the application of lasers, streak cameras and optical dissectors for measurements and operations of particle beams in modern electron and positron accelerators.	
LWC3 • 16:00-16:30 • ORAL *Photodynamic Therapy of Gonarthrosis with Fotoditazin,* T.A. Zharova, S.V. Ivannikov, A.M. Tonenkov, E.Ph. Stranadko, L.A. Semenova, M.M. Smorchkov, V.I. Makarov, I.D. Romanishkin, A.V. Ryabova, V.B. Loschenov, *I.M. Sechenov First Moscow State Medical Univ., A.M. Prokhorov Inst. of General Physics, RAS, Russia.* The experimental research is conducted with application of the model of posttraumatic gonarthritis on 35 rabbits. Specific features of Chlorin e6 derivatives (Ce6) photosensitizer (PS) accumulation in tissues of a knee joint and efficiency of photodynamic therapy (PDT) at gonarthritis treatment are studied experimentally.The analysis of results of clinical and morphological research shows that PDT is a low-invasive method of gonarthritis treatment with a high degree of efficiency and selectivity of action.		
.LWC4 • 16:30-16:45 • ORAL *Study of the fluorescence intensity decay of nanophotosensitizers using time-resolved spectroscopy methods,* F.G. Bystrov, V.I. Makarov, V.B. Loschenov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* The effect of the biological environment on the fluorescence properties of aluminum phthalocyanine nanoparticles (nan-AlPc) was studied. The measurements were carried out using registration system based on Hamamatsu streak camera C10627 with picosecond temporal resolution and picosecond laser with 637 nm wavelength and 65 ps pulse duration. The presence of two fluorescence lifetimes 5 ns and 10 ns was registered for nan-AlPc incubated with macrophages. The significant change in fluorescence kinetics of nan-AlPc, deposited under mice skin autografts, was observed after photodynamic treatment. Obtained information on nan-AlPc fluorescence kinetics is fundamental for building up a model of AlPc – biological environment interactions.	LWD4 • 16:15-16:45 • INVITED *X-ray diffractometry with synchrotron radiation for exploration of fast processes in solids with nanosecond time resolution,* B.P. Tolochko, K.A. Ten, V.V. Zhulanov, L.I. Shehtman, A.S. Arakcheev, K.V. Zolotarev, *Inst. of Solid State Chemistry and Mechanochemistry SB RAS, Russian Federation.* A fast one-coordinate X-ray detector was developed for experiment to study the behavior of the crystal lattice of the material of the fusion reactor first wall during a plasma discharge on the diverter. The detector enables fast recording of 100 diffraction frames with an exposure time of 73 ps and a periodicity of 100 ns.	

Hall 1
LAT-05/3

17:00-18:15
LWE • Nanomaterials for Lasers (LAT-05/3)
Evgenii Lutsenko, *B.I. Stepanov Inst. of Physics of NASB, Belarus, Chair*

LWE1 • 17:00-17:30 • INVITED
Optical effects in self-assembled organic frustum shaped microstructures, E.A. Mamonov, I.A. Kolmychek, A.I. Maydykovskiy, V.B. Novikov, T.V. Murzina, D. Venkatakrishnarao, YSLV Narayana, R. Chandrasekar, *Lomonosov Moscow State Univ., Russia.* We discuss photonic effects in self-assembled organic microstructures prepared by self-assembly technique. It is shown that particle composition and geometry brings about a number of unique shape and size dependent optical properties of the structures.

LWE2 • 17:30-18:00 • INVITED
Laser ablation: from nanoparticles to nanostructures, E. V. Barmina, *Wave Research Center of A.M. Prokhorov General Physics Inst., RAS, Russia.* The talk summarizes the characteristics and formation mechanisms of different kinds of nanoobjects fabricated by means of laser ablation in liquids. Two distinct approaches are reviewed as a function of laser parameters: laser surface nanostructuring and nanoparticles generation.

Hall 2
ICONO-03/1

17:00-18:30
IWG • Nanophotonics and Plasmonics I (ICONO-03/1)
Pavel Melentiev, *Inst. for Spectroscopy, Russia, Chair*

IWG1 • 17:00-17:30 • INVITED
Functional plasmonic nanostructures for photon manipulation, Jer-Shing Huang, Kel-Meng See, Fan-Cheng Lin, Tzu-Yu Chen, *National Tsing Hua Univ., Taiwan.* We present two functional plasmonic nanostructures for photon manipulation, namely a 2D plasmonic Doppler grating (PDG) with azimuthal angle-dependent periodicity for index sensing and a photoluminescence-driven log-periodic nanoantenna for broadband directional photon source.

IWG2 • 17:30-17:45 • ORAL
Optical trapping of dielectric nanoparticles enhanced by Mie resonances in Si dimers, D.A. Shilkin, A.S. Shorokhov, E.V. Lyubin, M.R. Shcherbakov, M. Lapine, Duk-Yong Choi, Y.S. Kivshar, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* We study the optical force produced in the gap of a Si nanodisk dimer acting on an external dielectric particle. We predict a three order-of-magnitude enhancement of the trapping force compared to the plane wave radiation pressure under the condition of the Mie resonances of the dimer.

Hall 3
ICONO-04/5

17:00-18:30
IWH • Nonlinear Optics and Novel Phenomena V (ICONO-04/5)
Andrei Fedotov, *Lomonosov Moscow State Univ., Russia, Chair*

IWH1 • 17:00-17:30 • INVITED
Towards Raman quantum memory in isotopically pure rare-earth-ion-doped solids, R.A. Akhmedzhanov, L.A. Gushchin, A.A. Kalachev, S.L. Korableva, D.A. Sobgayda, I.V. Zelensky, *Zavoisky Physical-Technical Inst. of Russian Academy of Sciences, Russia.* Theoretical and experimental results obtained recently on the way to realization of Raman quantum memories in impurity crystals are reported

IWH2 • 17:30-17:45 • ORAL
Electromagnetic field amplification and nonlinear optical processes threshold lowering near the surface of mesoporous photonic crystals, V.S. Gorelik, A.D. Kudryavtseva, V.A. Orlovich, P.P. Sverbil, A.I. Vodchits, Y.P. Voinov, N.V. Tcherniega, L.I. Zlobina, *Lebedev Physical Inst. of the Russian Academy of Sciences, Russia.* Stimulated Raman Scattering and Optical Harmonics Generation in mesoporous photonic crystals are investigated. The effects of electromagnetic field amplification and nonlinear optical processes threshold lowering in such structures are discussed.

Hall 4 LAT-04/3	Hall 5 LAT-03/4	Notes
17:00-18:30 LWF • Biophotonics and Laser Biomedicine (LAT-04/3) Boris Dzhagarov, *B.I. Stepanov Inst. of Physics of NASB, Belarus, Chair*	17:00-18:30 LWG • Ultra-Fast Diagnostics in Laser Research (LAT-03/4) Mikhail Korjik, *Research Inst. for Nuclear Problems of Belarus State Univ., Belarus, Chair*	
LWF1 • 17:00-17:15 • ORAL ***Broadband Terahertz in-line Phase Contrast Imaging,*** A.A. Ushakov, P.A. Chizhov, V.V. Bukin, A.B. Savel'ev, S.V. Garnov, *A.M. Prokhorov General Physics Inst., RAS, Lomonosov Moscow State Univ., Russia.* We demonstrate a pulse broadband (from 0.1 to 1.5 THz) terahertz phase contrast imaging system by using the electro-optical crystal ZnTe. This system allows studying the depth information, refractive index and absorption of the objects	LWG1 • 17:00-17:30 • INVITED ***Two photon processes for a fast timing in nuclear instrumentation,*** M. Korjik, O. Bugnavov, A. Fedorov, V. Mechinsky, S. Tichomirov, G. Tamulaitis, E. Auffray, M. Lucchini, *Inst. for Nuclear Problems of Belarus State Univ., Belarus.* Here we report first results of the study by two photon absorption methods of the ultra-fast phenomena in inorganic scintillation materials with the purpose to develop new detecting techniques of ionizing radiation.	
LWF2 • 17:15-17:30 • ORAL ***The Study of Aluminum Phthalocyanine Nanoparticle Fluorescent Properties Changes in Tissue Engraftment for the Small Laboratory Animals Cross Skin Transplantation,*** D.S. Farrakhova, E.V. Akhlyustina, V.I. Makarov, D.V. Pominova, A.V. Ryabova, *National Research Nuclear Univ. "MEPhI", Russia.* The possibility of aluminum phthalocyanine nanoparticles (nAlPc) application for evaluation of skin engraftment was studied. The analysis of fluorescent properties dynamic of tissue engraftment for cross skin transplantation of small laboratory animals was produced.		
LWF3 • 17:30-17:45 • ORAL ***Raman and FTIR spectroscopy in the THz frequency range in the study of protein structure,*** A. A. Mankova, N. N. Brandt, and A. Yu. Chikishev, *Lomonosov Moscow State Univ., Russia.* Structural changes of proteins resulting from violation of optimal conditions for functioning are studied using low-frequency Raman and FTIR spectroscopy. Effects of thermal denaturation, cleavage of disulfide bonds, and inhibition on protein structure are analyzed	LWG2 • 17:30-18:00 • INVITED ***Andor Technology: advanced and versatile camera technology for nanosecond gated imaging and spectroscopy,*** T. Pieper, Y. Zheleznov, *LOT-Quantum Design GmbH, Germany.* Scientific imaging in physics applications either requires a high sensitivity, high spatial or high temporal resolution. From Andor Technology there are cameras for each of these tasks. With special emphasize on the observation of fast processes we try to 'illuminate' the variety of available imaging cameras and simplify the choice. A clear distinction is made between intensified and non-intensified, gated and non-gated cameras. Starting from the level of CCD we compare the concept of ICCD cameras and introduce Andor Technology's new intensified sCMOS camera. Improvements in pixel resolution, read noise and frame rate are discussed.	

Hall 1 LAT-05/3	Hall 2 ICONO-03/1	Hall 3 ICONO-04/5
17:00-18:15 LWE • Nanomaterials for Lasers (LAT-05/3)—Continued	17:00-18:30 IWG • Nanophotonics and Plasmonics I (ICONO-03/1)—Continued	17:00-18:30 IWH • Nonlinear Optics and Novel Phenomena V (ICONO-04/5)—Continued
	IWG3 • 17:45:18:00 • ORAL *Morphology and optical properties of self-assembled nanostructures of a novel Indotricarbocyanine dye,* N.V. Belko, M.P. Samtsov, G.A. Gusakov, E.S. Voropay, *A.N. Sevchenko Inst. of Applied Scientific Problems, Belarusian State Univ., Belarus.* Indotricarbocyanine dye self-assembles in water-ethanol solutions into nanostructures. Their morphology was studied by atomic force microscopy, and their optical properties were investigated by absorption spectroscopy. Correlation between morphology and absorption spectra was examined.	IWH3 • 17:45-18:00 • ORAL *Compositional dependence of the nonlinear optical properties of glasses in the GexS100-xI10 system,* A.V. Romashkin, A.A. Murzanev, A.S. Lobanov, L.A. Mochalov, A.I. Korytin, A.N. Stepanov, *Inst. of Applied Physics RAS, Russia.* The nonlinear optical properties of glasses in the GexS90-xI10 system were studied as a function of their composition. For the (GeS2)90I10 composition, the nonlinear index reaches its minimum value and the two-photon absorption is maximal
LWE3 • 18:00-18:15 • ORAL *Carbon nanotube based composites as materials for terahertz application,* M. V. Shuba, S. A. Maksimenko, *Inst. for Nuclear Problem, Belarus State Univ., Belarus.* Length dependent localized plasmon resonance contributes to the terahertz response of single-walled carbon nanotubes. It has been shown that terahertz effective permittivity of the carbon nanotubes based composite strongly depends on the nanotube length.	IWG4 • 18:00-18:15 • ORAL *Electrically controlled LC devices for spatial-polarization optical operation,* I.I. Rushnova, E.A. Melnikova, O.S. Kabanova, A.L. Tolstik, *Belarusian State Univ., Belarus.* Topology of the liquid-crystal structure with the electrically-controlled refractive interface has been proposed to realize the regime of spatial switching for the orthogonally polarized modes and the waveguide propagation of linearly polarized laser radiation.	IWH4 • 18:00-18:15 • ORAL *Amplified spontaneous emission in two-photon excited Rb vapour,* A.M. Akulshin, D. Budker, and R. J. McLean, *Swinburne Univ. of Technology, Australia.* Experimental study of spectral and spatial characteristics of mid-IR radiation generated on the population inverted transition in Rb vapour is presented. A new way of detecting two-photon excitation in atomic media using amplified spontaneous emission is suggested.
	IWG5 • 18:15-18:30 • ORAL *Collective processes of formation plasmon pulses in the waveguide spaser based on the metal/dielectric interface pumped by semiconductor quantum dots,* A.S. Shesterikov, M.Yu. Gubin, M. G. Gladush, A. V. Prokhorov, *Stoletovs Vladimir State Univ., Russia.* The problem of plasmon pulses formation in metal/dielectric interface during the process of the cooperative decay of excited quantum dots placed in the dielectric layer near the metal surface is considered.	IWH5 • 18:15-18:30 • ORAL *3 mm thick PPLN structures for intracavity pumping of cascade optical parametric oscillator,* D. Kolker, A. Boyko, N. Kostyukova, A. Pronyushkina, I. Shertsov, S. Trashkeev, B. Nuyshkov and V. Shur, *Novosibirsk State Univ., Russia.* we are demonstrating an optical parametric oscillator based on 3 mm Labfer PPLN structures for intracavity pumping of secondary AGSe-OPO. Four different PPLN structures were investigated and effective aperture for effective pumping was defined.

Hall 4 LAT-04/3	Hall 5 LAT-03/4	Notes
17:00-18:30 LWF • Biophotonics and Laser Biomedicine (LAT-04/3)—Continued	17:00-18:30 LWG • Ultra-Fast Diagnostics in Laser Research (LAT-03/4)—Continued	
LWF4 • 17:45-18:00 • ORAL *Aluminum phthalocyanine nanoparticles as a contrast agent for the detection of tooth enamel microdamage,* J.O. Kuznetsova, D.S. Farrakhova, M.G. Yassin, *National Research Nuclear Univ. "MEPhI", Russia.* The possibility of aluminum phthalocyanine nanoparticles (nAlPc) application for diagnosis, prevention and therapy of inflammatory diseases in dentistry is presented. It was detected that nAlPc fluoresces in the nanoparticle form in the presence of pathologic microflora. It will make possible to detect the local accumulation of pathological microflora in the tooth enamel microdamage. Experimental studies of interaction of nAlPc with tooth enamel and in the presence of different components of toothpaste.		
LWF5 • 18:00-18:15 • ORAL Adaptive optics multispectral fundus-camera (AOMFC) for detection of retinal pathology, A.V. Bolshunov, E.A. Katalevskaya, A.V. Larichev, N.G. Iroshnikov, *Research Inst. for Eye Diseases, Russia.* High-resolution adaptive optics multispectral fundus-camera imaging enables early detecting of dry age-related macular degeneration (AMD), nonproliferative and proliferative diabetic retinopathy, epiretinal membranes, idiopathic macular holes.	LWG3 • 18:00-18:15 • ORAL *A new method of electron scrubbing of microchannel plates,* P.I. Konovalov, A.S. Dolotov, R.I. Nurtdinov, M.P. Vikulin, *Dukhov Research Inst. of Automatics (VNIIA), Russian Federation.* It was proposed a new method of electron scrubbing of microchannel plates which can solve the problem of using the ion-barrier films in fast photoelectric devices.	
	LWG4 • 18:15-18:30 • ORAL *Ultrafast deactivation of excitation energy in rutin and quercetin via electron and proton transfers,* S.L. Bondarev, S.A. Tikhomirov, V.N. Knyukshto, O.V. Buganov, A.D. Shirokanov, T.F. Raichenok, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Using femtosecond spectroscopy and steady-state luminescence methods, the mechanisms of very fast non-radiative deactivation (knr ~ 5×1011 c-1) of the electronic excitation energy at room temperature in organic and buffer solutions of well-known natural antioxidants rutin and quercetin have been investigated.	

Hall 1
ICONO-10/1

09:00-11:00
IThA ● Quantum Optomechanics I (ICONO-10/1)
Stefan Danilishin, *Univ. of Glasgow, UK, Chair*

IThA1 • 09:00-09:45 • KEYNOTE
Quantum Optomechanics: Sensitivity Beyond the Standard Quantum Limit and Test of Quantum Mechanics, Yanbei Chen, *California Inst. of Technology, USA.* Progress in quantum optomechanics has enabled the preparation and manipulation of macroscopic objects in the quantum regime. I will discuss how this can allow us to increase measurement sensitivity and study fundamental physics.

Hall 2
ICONO-03/2

09:00-11:00
IThB ● Nanophotonics and Plasmonics II (ICONO-03/2)
Jer-Shing Huang, *National Tsing Hua Univ., Taiwan, Chair*

IThB1 • 09:00-09:30 • INVITED
Nanoantenna-assisted picosecond nonlinear all-optical switching, O.L. Muskens, Y. Wang, L. Bergamini, N. Zabala, J. Aizpurua, J. Gaskell, D.W. Sheel, K.C. H. de Groot, *Univ. of Southampton, UK.* We exploit the large nonlinearity of metal oxides, i.e. the Drude nonlinearity in ITO and metal-insulator phase transition in VO2, in combination with plasmonic field enhancement to achieve picosecond antenna-assisted all-optical switching.

IThB2 • 09:30-09:45 • ORAL
Efficient optical-harmonics generation and nonlinear Purcell effect in metal/pphotonic crystal structures, B.I. Afinogenov, A.A. Popkova, V.O. Bessonov, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* Enhancement of second and third optical-harmonics generation is experimentally observed in metal/photonic crystal structures under conditions of Tamm plasmon-polariton excitation. It is shown that amplification can occur via two mechanisms: resonant fundamental wave and resonant second-harmonic.

Hall 3
ICONO-04/6

09:00-11:00
IThC ● Nonlinear Optics and Novel Phenomena VI (ICONO-04/6)
Alexey Kalachev, *Zavoisky Physical-Technical Inst. of Russian Academy of Sciences, Russia, Chair*

IThC1 • 09:00-09:30 • INVITED
Observation of coherent optical phonons in thin antimony films by time-resolved electron diffraction method, B. N. Mironov, V. O. Kompanets, S. A. Aseev, A. A. Ishchenko, O. V. Misochko, S. V. Chekalin, and E. A. Ryabov, *Inst. of Spectroscopy, RAS, Russia.* The generation of coherent optical phonons (A1g, Eg modes and their combinations) excited by femtosecond laser pulses (λ = 800 nm) has been directly observed in Sb films by electron diffraction in femtosecond time domain

IThC2 • 09:30-10:00 • INVITED
Self-assembled plasmonic nonlinear metamaterials, A. Belardini, G. Leahu, M. Centini, E. Petronijevic, C. Sibilia, *Sapienza Università di Roma, Italy.* Plasmonic metamaterials are very promising systems for electromagnetic field enhancement and manipulation. Metal sharp edges allows ease to reveal nonlinear optical response. Self-assembled fabrication approach presents different advantages like large area and low cost fabrication.

Hall 4 LAT-04/4	Hall 5	Notes

09:00-11:15
LThA ● Biophotonics and Laser Biomedicine (LAT-04/4)
Tatiana Savelieva, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*

LThA1 • 09:00-09:45 • KEYNOTE
Optical Coherence Tomography: Technology and Applications, J.G. Fujimoto, *Massachusetts Inst. of Technology (MIT), USA*. Optical coherence tomography (OCT) uses photonics to enable micron-resolution 3D structural and functional imaging in tissues. It is a standard ophthalmic diagnostic and is being developed for many clinical applications. We review technology and applicati

Hall 1
ICONO-10/1

09:00-11:00
IThA ● Quantum Optomechanics I
(ICONO-10/1)—Continued

IThA2 • 09:45-10:15 • INVITED
Light-matter interfaces for quantum simulations and information processing, K. Hammerer, *Univ. of Hannover, Germany.* Radiation pressure is now a limiting factor in laser-based sensing of positions and forces, as witnessed in a large range of systems from gravitational wave detectors to micromechanical devices. Despite being a limiting factor in some applications, the quantum coherent nature of radiation pressure effects in these systems enables fascinating perspectives for fundamental tests of physics realizing textbook experiments in quantum physics. Beyond fundamental tests, radiation pressure has become a newly mechanism for manipulating quantum states of light and matter and can be exploited for applications in quantum information processing and communication.

IThA3 • 10:15-10:45 • INVITED
Optomechanical quantum correlations in a multimode nanomechanical membrane resonator, Y. Tsaturyan, W. H. P. Nielsen, C. Møller, A. Barg, E. Polzik, A. Schliesser, *Niels Bohr Inst. Copenhagen Univ., Denmark.* We realize nanomechanical membranes with low mass and high coherence by fully exploiting dissipation dilution and phononic bandgap shielding. Light trapped in a compact Fabry-Perot resonator detects such membranes' motion with a measurement rate (96 kHz) that exceeds the mechanical decoherence rates already at moderate cryogenic temperatures (10K). This gives rise to detectable optomechanical quantum correlations with a multitude of mechanical modes. The multi-mode nature of this system lends itself to hybrid entanglement schemes involving electronic, mechanical and optical degrees of freedom.

Hall 2
ICONO-03/2

09:00-11:00
IThB ● Nanophotonics and Plasmonics II
(ICONO-03/2)—Continued

IThB3 • 09:45-10:00 • ORAL
Second and third harmonic generation in silicon metasurfaces with spectrally overlapped electric and magnetic dipolar resonances, E.V. Melik-Gaykazyan, A.S. Shorokhov, V.V. Zubyuk, M.K. Kroychuk, D.-Y. Choi, T.V. Dolgova, M.R. Shcherbakov, D.N. Neshev, A.A. Fedyanin, Y. Kivshar, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We report on the second- and third-harmonic-generation enhancement in silicon nanodisk arrays with spectrally overlapping Mie resonances being excited at double and triple pump frequencies, respectively.

IThB4 • 10:00-10:30 • INVITED
Nonlinear semiconductor metasurfaces, M.R. Shcherbakov, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We will overview a recently emerged class of nanostructures for enhanced light-matter interaction — semiconductor metasurfaces based on high-index nanocavities, which reveal enhanced nonlinear-optical response and novel possibilities for ultrafast all-optical switching.

Hall 3
ICONO-04/6

09:00-11:00
IThC ● Nonlinear Optics and Novel Phenomena VI
(ICONO-04/6)—Continued

IThC3 • 10:00-10:15 • ORAL
High harmonics ellipticity study in near-atomic field strength, A.V. Andreev, S.Yu. Stremoukhov, O.A. Shoutova, *Lomonosov Moscow State Univ., Russia.* Influence of the polarization properties of components of two-color laser field interacting with atom is studied in different geometries and using simple model of atomic energy level structure. Prospects of high ellipticity harmonics are discussed.

IThC4 • 10:15-10:30 • ORAL
Parametric refraction at the acousto-optical interaction of pulsed beams in anisotropic media, D.M. Zverev, G.A. Knyazev, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We investigate a parametric refraction phenomenon at the acousto-optical pulsed beams interaction. If there is no phase matching condition the optical signal is spatially and temporarily modulated by acoustical pulsed beam because of cascade nonlinearity.

Hall 4 LAT-04/4	Hall 5	Notes

09:00-11:15
LThA ● Biophotonics and Laser Biomedicine
(LAT-04/4)—Continued

LThA2 • 09:45-10:15 • INVITED
Aftereffect of low-intensity of He-Ne laser irradiation on the activation of ATP synthesis and reprogramming of the genome, T. I. Karu, V. M. Manteifel, L. V. Pyatibrat, *Inst. of Crystallography and Photonics of RAS, Russia.* Aftereffect of low-intensity laser radiation (LILI) on the structure of mitochondria was revealed. Changes of mitochondria reflect activation of oxidative phosphorylation, which may be the result of genome reprogramming.

LThA3 • 10:15-10:45 • INVITED
Noninvasive blood glucose monitoring with THz reflection spectroscopy, O. P. Cherkasova, M.M. Nazarov, A. P. Shkurinov, *Inst. of Laser Physics of SB RAS, Russia.* Human skin optical properties were studied in vivo using terahertz time-domain spectroscopy with silicon Dowe prism in the attenuated total internal reflection (ATR) configuration. The measurements were carried out on volunteers with normal blood glucose concentration and after glucose intake. The variations of the reflection spectra of human skin were correlated with the changes in blood glucose level. Our results demonstrate the possibility of a non-invasive real-time measurement of blood glucose concentration.

Hall 1 ICONO-10/1	Hall 2 ICONO-03/2	Hall 3 ICONO-04/6
09:00-11:00 IThA ● Quantum Optomechanics I (ICONO-10/1)—Continued	09:00-11:00 IThB ● Nanophotonics and Plasmonics II (ICONO-03/2)—Continued	09:00-11:00 IThC ● Nonlinear Optics and Novel Phenomena VI (ICONO-04/6)—Continued
	IThB5 • 10:30-10:45 • ORAL *Third-harmonic generation from silicon nanodisk clusters with magnetic Fano resonances,* A.S. Shorokhov, E.V. Melik-Gaykazyan, D.A. Smirnova, B. Hopkins, K.E. Chong, D.-Y. Choi, M.R. Shcherbakov, A.E. Miroshnichenko, D.N. Neshev, A.A. Fedyanin, Y.S. Kivshar, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We study the third-harmonic generation from silicon nanodisk quadrumers and demonstrate the hundredfold increase of the harmonic signal near the magnetic Fano resonance, associated with the interference of the individual and collective optically-induced magnetic modes.	IThC5 • 10:30-10:45 • ORAL *Figures of merit for exited-state absorption of phthalocyanine dyes,* M.F. Koldunov, L.M. Koldunov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Experimental data analysis of exited-state absorption of phthalocyanine dyes series is carried out based on scaling law, parameters of which (critical intensity and contrast) are figures of merit of exited state absorption. Figures of merit are found out for several dyes.
IThA4 • 10:45-11:00 • ORAL *Preparing a mechanical oscillator of an optomechanical cavity in a nonclassical state,* A.A. Rakhubovsky, R. Filip, *Department of Optics, Palacký Univ., Czech Republic.* A mechanical oscillator of an optomechanical cavity can be prepared in a quantum state exhibiting negativity and quantum non-Gaussianity of Wigner function by uploading a displaced single photon to the optomechanical cavity.	IThB6 • 10:45-11:00 • ORAL *Electrical Tuning of All Dielectric Metasurfaces by Liquid Crystals,* A. Komar, Z. Fang, I. Staude, M. Decker, A. Miroshnichenko, J. Bohn, J. Sautter, I. Brener, Y. S. Kivshar, D.N. Neshev, *The Australian National Univ., Australia.* We demonstrate experimentally electrical tuning of dielectric metasurface, consisting of silicon disks infiltrated with liquid crystals. We show that by switching a voltage we can achieve 100% amplitude modulation and π phase shift.	IThC6 • 10:45-11:00 • ORAL *Multiple filamentation suppression in Xenon,* A.V. Shutov, A.A. Ionin, D.V. Mokrousova, L.V. Seleznev, I.V. Smetanin, E.S. Sunchugasheva, N.N. Ustinovskii, V.D. Zvorykin, *P.N. Lebedev Physics Inst. of RAS, Russia.* An effective suppression of multiple filamentation of the TW peak power supercritical UV laser beam in Xenon gas was demonstrated due to large negative nonlinear refractive index.

Hall 4 LAT-04/4	Hall 5	Notes

09:00-11:15
LThA ● Biophotonics and Laser Biomedicine
(LAT-04/4)—Continued

LThA4 • 10:45-11:00 • ORAL
High efficiency stimulated low-frequency Raman scattering in water/buffer suspension of potato viruses (PVX&PVA), A.F. Bunkin, M.Ya. Grishin, O.V. Karpova, A.D. Kudryavtseva, V.N. Lednev, T.V. Mironova, S.M. Pershin, E.K. Petrova, M.A. Strokov, N.V. Tcherniega, K.I. Zemskov, *P.N. Lebedev Physical Inst. of RAS, Russia.* Stimulated low-frequency Raman scattering (SLFRS), caused by Ruby laser pulses interaction with the vibration modes of potato viruses X (PVX) in Tris-HCl pH7,5 buffer and A (PVA) in water suspension was registered. Frequency shift (in GHz scale), efficiency conversion (up to 10%) and SLFRS threshold are measured.

LThA5 • 11:00-11:15 • ORAL
Optimization of Spectral Range of Radiation to Enhance the Efficiency of Phototherapy for Neonatal Jaundice, V.Yu. Plavskii, A.V. Mikulich, I.A. Leusenko, A.I. Tretyakova, L.G. Plavskaya, N.S. Serdyuchenko, J. Gao, D. Xiong, X. Wu, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* It is shown that efficiency of phototherapy for hyperbilirubinemia of newborns using LEDs depends not only on position of maximum in emission spectrum within the absorption band of bilirubin but also on width of spectrum of incident radiation.

Hall 1
ICONO-10/2

11:30-13:30
IThD ● Quantum Optomechanics II (ICONO-10/2)
Klemens Hammerer, *Univ. of Hannover, Germany, Chair*

IThD1 • 11:30-12:00 • INVITED
Towards a quantum optical-to-microwave transducer, X. Chen, C. Chardin, K. Makles, R. Braive, I. Robert-Philip, T. Briant, P.-F. Cohadon, A. Heidmann, T. Jacqmin, S. Deléglise, *Laboratoire Kastler Brossel, France.* Superconducting quantum circuits are a very promising route towards the realization of quantum computers. We are realizing a transducer based on a vibrating nanomembrane that will enable quantum communication between distant computers through optical fibers.

IThD2 • 12:00-12:30 • INVITED
Optomechanics and quantum noise with AlGaAs microstructures, T. Corbitt, R. Singh, J. Cripe, and G. Cole, *Louisiana State Univ., USA.* AlGaAs microfabricated resonators were used to demonstrate strong optomechanical interactions in an optical cavity. These devices may allow for direct observation of the Standard Quantum Limit.

Hall 2
ICONO-03/3

11:30-13:00
IThE ● Nanophotonics and Plasmonics III (ICONO-03/3)
Otto Muskens, *Univ. of Southampton, UK, Chair*

IThE1 • 11:30-12:00 • INVITED
Mie-resonant dielectric metasurfaces and nanoantennas, I. Staude, *Insitute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Univ. Jena, Germany.* Mie-type resonances of high-index dielectric and semiconductor nanoparticles are a versatile platform for manipulating the generation and propagation of light. In this talk, I will report on our recent progress in this field.

IThE2 • 12:00-12:15 • ORAL
Diffraction-Induced Femtosecond Pulse Splitting Effect Enhanced by Slow Light in 2D Photonic Crystals, S.E. Svyakhovskiy, B.I. Mantsyzov, *Lomonosov Moscow State Univ., Russia.* The effect of diffraction-induced pulse splitting in 1D photonic crystals can be enhanced by introducing another direction of periodicity due to light localization. Effect is studied in combination of Laue and Bragg geometric schemes.

Hall 3
ICONO-04/7

11:30-13:00
IThF ● Nonlinear Optics and Novel Phenomena VII (ICONO-04/7)
Alessandro Belardini, *Sapienza Università di Roma, Italy, Chair*

IThF1 • 11:30-12:00 • INVITED
Nonlinear optics of tunable midinfrared pulses in solids for broadband spectroscopy and subcycle pulse generation, A.B. Fedotov, A.A. Lanin, E.A. Stepanov, A.A. Voronin, A.M.Zheltikov, *Lomonosov Moscow State Univ., Russia.* We have shown that a strongly coupled nonlinear spatiotemporal dynamics of ultrashort mid-IR pulses undergoing self-focusing simultaneously with soliton self-compression in an anomalously dispersive, highly nonlinear solid semiconductor (GaAs) can provide a source of multioctave supercontinua with spectra spanning the entire mid-IR range and compressible to from few cycles to subcycle pulse widths.

IThF2 • 12:00-12:15 • ORAL
Extreme nonlinear optics with top-hat beams: Toward spatially uniform pulse compression at the subpetawatt level of peak powers, M.M. Nazarov, A.V. Mitrofanov, A.A. Voronin, D.A. Sidorov-Biryukov, V.Ya. Panchenko, and A.M. Zheltikov, *Kurchatov Inst., Russia.* High-peak-power laser beams with a top-hat transverse intensity profile are shown to offer unique options for the spectral and temporal nonlinear-optical transformations of high-intensity laser fields, promising a new technology of spatially uniform pulse compression at the subpetawatt level of peak powers.

Hall 4 LAT-04/5	Hall 5	Notes

11:30-13:30
LThB • Biophotonics and Laser Biomedicine (LAT-04/5)
Boris Dzhagarov, *B.I. Stepanov Inst. of Physics of NASB, Belarus, Chair*

LThB1 • 11:30-12:00 • INVITED
Sensitizer-nanoparticles for tissue diagnostics and PDT, R. Steiner, C. Scalfi-Happ, R. Wittig, A. Ryabova, S. Gräfe and V. Loschenov, *Institut für Lasertechnologien in der Medizin und Messtechnik an der Universität Ulm, Germany.* Nanoparticles of sensitizer raw materials like chlorins, phthalocyanines or porphyrins are non fluorescent. They will be taken up especially by macrophages. In the cells molecules dissolve, become fluorescnet and photoactive. Therefore, such nanoparticles are well suited for specific fluorescence diagnosis of inflamed or cancerous tissue and for PDT.

LThB2 • 12:00-12:30 • INVITED
Multiphoton Fluorescence Microscopy and Real Time Rendering for Rapid Evaluation of Surgical Cancer Specimens, M.G. Giacomelli, T. Yoshitake, L. Cahill, Y. Sheykin, H. Vardeh, J. Connolly, and J.G. Fujimoto, *Massachusetts Inst. of Technology (MIT), USA.* Surgical cancer specimens can be imaging by rapid staining and multiphoton fluorescence microscopy. GPU accelerated color re-mapping generates images similar to H&E histology. These methods promise to enable real time evaluation of surgical cancer margi

Hall 1
ICONO-10/2

11:30-13:30
IThD ● Quantum Optomechanics II
(ICONO-10/2)—Continued

IThD3 • 12:30-13:00 • INVITED
Towards Sagnac speed meter interferometers for gravitational wave detection, C. Graef, B. W. Barr, A. S. Bell, S. L. Danilishin, J.-S. Hennig, E. A. Houston, S. H. Huttner, S. S. Leavey, D. Pascucci, B. Sorazu, A. Spencer, S. Steinlechner, K. A. Strain, J. Wright, T. Zhang, and S. Hild, *Univ. of Glasgow, UK*. First and second generation earth based laser interferometric Gravitational Wave Detectors are variants of the well-known Michelson interferometer configuration with kilometre scale arms. Second generation detectors, such as the Advanced LIGO detectors in the United States, will, for the first time, be limited in their sensitivities by quantum mechanical fluctuations in the instruments over a large frequency range in their detection bands. Successive measurements of the position of the test mass mirrors in a Michelson interferometers do not commute when viewed from the perspective of quantum mechanics and are thus limited in their accuracy by the Heisenberg Uncertainty Principle (HUP). A promising option to overcome these limitations is the adoption of interferometer configurations in which the velocity of the test mass mirrors is measured rather than their relative displacement. These so-called "speed meter interferometers" were proposed to achieve sensitivities beyond the "wall" imposed by the HUP in conventional Michelson interferometers. At the Inst. for Gravitational Reseach at Glasgow Univ., UK, we are working on the realisation of the world's first Sagnac speed meter interferometer to demonstrate its superiority to comparable Michelson-based configurations in terms of better sensitivity at low signal frequencies. In this talk I will give an overview of the Glasgow Sagnac Speed Meter Project and the current status of the experiment.

Hall 2
ICONO-03/3

11:30-13:00
IThE ● Nanophotonics and Plasmonics III
(ICONO-03/3)—Continued

IThE3 • 12:15-12:30 • ORAL
Ultrafast all-optical modulation of femtosecond laser pulses in GaAs nanodisks with Mie-type resonances, V.V. Zubyuk, P. Vabishchevich, M.R. Shcherbakov, T.V. Dolgova, S. Liu, G.A. Keeler, I. Staude, I. Brener, A. A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* In this paper, we experimentally demonstrate ultrafast laser pulse modulation in subwavelength gallium arsenide nanodisks exhibiting localized Mie-type resonances.

IThE4 • 12:30-12:45 • ORAL
Enhanced transverse magneto-optical Kerr effect in multilayered one-dimensional magnetoplasmonic crystals with narrow slits, A.Yu. Frolov, M.R. Shcherbakov, A.A. Fedyanin, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Transverse magneto-optical Kerr effect enhancement in the transmittance geometry driven by surface plasmon-polariton resonances with different quality factors was experimentally observed in one-dimensional multilayered magnetoplasmonic gratings with narrow slits.

IThE5 • 12:45-13:00 • ORAL
Transverse spin angular momentum of plasmon-polariton on the boundary of metamaterial with hyperbolic dispersion, S. Kurilkina, V. Belyi, N. Kazak, *B.I. Stepanov Inst. of Physics, NASB, Belarus.* The conditions are determined for formation of localized surface plasmon-polaritons with transverse spin angular momentum on the boundary of a uniaxial hyperbolic metamaterial with a dielectric. The possibility is established of controlling the value of transverse spin by changing the wavelength of radiation exciting plasmon-polaritons.

Hall 3
ICONO-04/7

11:30-13:00
IThF ● Nonlinear Optics and Novel Phenomena VII
(ICONO-04/7)—Continued

IThF3 • 12:15-12:30 • ORAL
Transverse linear momentum accompanying the reflection and refraction of a light beam carrying the intrinsic orbital angular momentum, V. G. Fedoseyev, *Inst. of Physics, Univ. of Tartu, Estonia.* The results of calculations of the Abraham and Minkowski transverse linear momenta, which are generated at the reflection and refraction of a paraxial light beam carrying the orbital angular momentum, are presented.

IThF4 • 12:30-12:45 • ORAL
Chirped CARS for microspectroscopy and visualization of oocytes and embryonic stem cells: Merits and demerits, K.A. Vereshchagin, A.V. Aybush, F.E. Gostev, V.A. Nadtochenko, *A.M. Prokhorov General Physics Inst. of RAS, Russia.* For microspectroscopy of oocytes and chemically-selective 3-D cell imaging and determination of a chemical composition of organelles in structure of a cell/embryo, femtosecond CARS-microscopy based on chirped CARS technique with scanning of collinear interacting light beams was used. Advantages and drawbacks of c-CARS approach for such a task have been analyzed and reported.

IThF5 • 12:45-13:00 • ORAL
Intense light channels formation in post-filament area of focused ultrashort laser pulse, Yu.E. Geints, A.A. Ionin, D.V. Mokrousova, L.V. Seleznev, D.V. Sinitsyn, E.S. Sunchugasheva, A.A. Zemlyanov, *Lebedev Phisical Inst. of RAS, Russia.* Angular divergence characteristics of a post-filamentation area, as well as characteristics of specific spatially localized light structures – post-filament channels, under different initial focusing conditions and the laser beam energy are studied experimentally and theoretically.

Hall 4 LAT-04/5	Hall 5	Notes

11:30-13:30
LThB ● Biophotonics and Laser Biomedicine
(LAT-04/5)—Continued

LThB3 • 12:30-12:45 • ORAL
Spectral luminescent properties of bacteriochlorin and aluminum phthalocyanine nanoparticles as hydroxyapatite implant surface coating., A.S. Sharova, Yu. S. Maklygina, B. Kundu, V.K. Balla, R. Steiner, V.B. Loschenov, *National Research Nuclear Univ. "MEPhI", Russia.* The spectral luminescent properties of developed by us coating for the hydroxyapatite implants were experimentally investigated in this study. Crystalline bacteriochlorin and aluminum phthalocyanine nanoparticles with photobactericidal properties were used as an implant coating. This research opens the prospect of such technology application in order to provide the local inflammatory and autoimmune reactions prevention in the area of implantation.

LThB4 • 12:45-13:00 • ORAL
Infrared (3-15 mkm) fiber skin in vivo spectroscopy and physiotherapy, L.N. Butvina, A.L. Butvina, V.D. Bitsoev, *Fiber Optics Research Center of RAS, Russian Federation.* Evanescent infrared spectroscopy by touch of the infrared fiber is a unique, non-traumatic method, does not require special preparation of the skin, is the method of optical biopsy. We have developed new fibers from silver halides with low optical losses in a wide spectral wavelength range of 3-15 μm, which allowed us to obtain spectra of skin in vivo from mild physiotherapy.

Hall 1 ICONO-10/2	Hall 2 ICONO-03/3	Hall 3 ICONO-04/7
11:30-13:30 IThD ● Quantum Optomechanics II (ICONO-10/2)—Continued	11:30-13:00 IThE ● Nanophotonics and Plasmonics III (ICONO-03/3)—Continued	11:30-13:00 IThF ● Nonlinear Optics and Novel Phenomena VII (ICONO-04/7)—Continued

IThD4 • 13:00-13:15 • ORAL
Internal squeezing for enhancing the sensitivity-bandwidth product of interferometric force detectors, M. Korobko, L. Kleybolte, S. Ast, H. Miao, Y. Chen, R. Schnabel, *Institut fuï Laserphysik, Universität Hamburg, Germany.* Internal squeezing is an approach to increasing the sensitivity-bandwidth product of cavity-enhanced interferometric force detectors, where the squeezing source is placed directly inside the detector cavity. We investigate the scheme theoretically and demonstrate experimentally an enhancement of the interferometer's sensitivity-bandwidth product by 2.6dB.

IThD5 • 13:15-13:30 • ORAL
Quantum speed meter based on dissipative coupling, S. Vyatchanin and A. Matsko, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We show that generalized dissipative opto-mechanical coupling enables a direct quantum measurement of speed of a free test mass. An optical detection of a weak classical mechanical force based on this interaction is proposed. The sensitivity of the force measurement can be better than the standard quantum limit.

Hall 4 LAT-04/5	Hall 5	Notes

11:30-13:30
LThB • Biophotonics and Laser Biomedicine
(LAT-04/5)—Continued

LThB5 • 13:00-13:15 • ORAL
Dissection of biological tissues under the influence of pulsed and quasi-continuous laser radiation, G.I. Zheltov, V.D. Burko, O.G. Romanov, *Belarusian State Univ. Faculty of Physics Department of Computer Modeling, Belarus.* Physical basis of low-temperature laser ablation of biological tissues under pulsed and quasi-continuous laser radiation have been developed. The physical and mathematical models of thermo-mechanical effect of pulsed radiation on absorbing tissues are presented, and numerical modeling has been performed for typical laser systems used in laser surgery.

LThB6 • 13:15-13:30 • ORAL
Laser Induced Relaxation of Triplet States for Sterically Distorted Metalloporphyrins, E. Zenkevich, A. Starukhin, V. Knyukshto, A. Gorski, M. Kijak, J. Solarski, A. Semeikin, T. Lyubimova, J. Waluk, *National Technical Univ. of Belarus, Belarus.* Based on laser time-resolved, steady-state measurements (293-77 K) and quantum chemical calculations the detailed picture of steric interactions as well as the reasons of T-state drastic shortening have been evaluated for non-planar meso-phenyl substituted Pd-octaethylporphyrins.

Hall 1
ICONO-09/1

14:30-16:30
IThG ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution I (ICONO-09/1)
Taras Plakhotnik, *The Univ. of Queensland, Australia, Chair*

IThG1 • 14:30-15:15 • KEYNOTE
***λ/2 Fabry Pérot micro**-resonators in single molecule spectroscopy,* A.J. Meixner, A. Konrad, M. Metzger, M. Brecht, *Inst. of Physical and Theoretical Chemistry, Eberhard Karls Univ., Germany.* Embedded in a tuneable λ/2-FabryPérot micro-resonator the radiative relaxation of dye molecule or quantum dot can reproducibly be modified allowing to determine their quantum yield, control Förster energy-transfer or localize them with nanometer precision.

Hall 2
ICONO-03/4

14:30-16:30
IThH ● Nanophotonics and Plasmonics IV (ICONO-03/4)
Isabelle Staude, *Insitute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Univ. Jena, Germany, Chair*

IThH1 • 14:30-15:00 • INVITED
Metasurfaces on alternative material platforms, A.V. Lavrinenko, R. Malureanu, E. Shkondin, F. Jensen, O. Takayama, P. V. Larsen, M. D. Mar, *Technical Univ. of Denmark, Denmark.* We report on fabrication of deeply profiled one- and two-dimensional lattices made from oxides: Al2O3, TiO2 and Al-doped ZnO (AZO). Such arrays can serve as metasurfaces in the mid-IR providing anisotropic or hyperbolic effective properties

IThH2 • 15:00-15:15 • ORAL
The bimetallic colloidal photonic crystals for plasmonic appliction, S. Kutrovskaya, A. Kucherik, S. Arakelian, A. Osipov, T. Vartanyan, T. Itina, *Stoletov Vladimir State Univ., Russia.* In this work a method of a laser synthesis of colloidal nanoparticles of noble metals and a formation of liquid photonic crystals are discussed.

Hall 3
ICONO-04/8

14:30-16:30
IThI ● Nonlinear Optics and Novel Phenomena VIII (ICONO-04/8)
Dmitri Sidorov-Biryukov, *Lomonosov Moscow State Univ., Russia, Chair*

IThI1 • 14:30-15:00 • INVITED
"Dark" modes backscattering as possible rationale for anomalous retroreflection from porous strongly absorbing nanostructures, V. V. Sergentu, V. Ursaki, Ed. Monaico, I. M. Tiginyanu, S. Ya. Prislopski, S. V. Gaponenko, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Previously discovered nomalous retroreflection is explained by using "dark" and "bright" modes. The consideration provides rationale not only for the retroreflection itself but explains correlations with absorption and differences for s- and p-polarized radiation retroreflection

IThI2 • 15:00-15:15 • ORAL
Generation of terahertz surface waves by a localized drag current, S. A. Uryupin, A. A. Frolov, *P.N. Lebedev Physical Inst., RAS, Russia.* A new nonlinear optical phenomenon—generation of terahertz surface waves by a drag current at an inclined incidence of a femtosecond laser pulse—has been theoretically described. The total energy surface waves increases with an increase in the frequency of electron collisions and with a decrease in their density.

Hall 4 LAT-04/6	Hall 5	Notes

14:30-16:30
LThC ● Biophotonics and Laser Biomedicine (LAT-04/6)
Victor Loshchenov, *A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*

LThC1 • 14:30-14:45 • ORAL
Spectroscopic Evaluation Method of Angiogenesis in the Healing of Skin Grafts Using Spectrally Sensitive to Inflammatory Reactions Aluminum Phthalocyanine Nanoparticles, V.I. Makarov, D.V. Pominova, M.N. Kholostsova, A.V. Ryabova, V.B. Loschenov, *A.M. Prokhorov General Physics Inst., RAS, Russian Federation.* The development of express method for assessing the state of skin graft by the spectroscopic properties of tissue components involved in the healing of the affected skin or healing of skin grafts was carried out in present work.

LThC2 • 14:45-15:00 • ORAL
Terahertz Irradiation of Parent Drosophila Accelerates an Achieving the Adult State in Offspring of the First Generation, V.I. Fedorov, N.Ya. Weisman, E.F. Nemova, *Inst. of Laser Physics of SB RAS, Russia.* An adulthood achievement of offspring obtained from irradiated females mating with irradiated or non-irradiated males is shortened by a few days. Maximal maturation of individuals occurs for one day earlier than the control. In the offspring of irradiated males and nonirradiated females a development to the adult stage differs significantly on a number of parameters.

Hall 1
ICONO-09/1

14:30-16:30
IThG ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution I
(ICONO-09/1)—Continued

IThG2 • 15:15-15:30 • ORAL
Influence of excitation intensity on duration of bright and dark intervals in blinking fluorescence of single CdSe/ZnS core/shell quantum dots, I.Yu. Eremchev, I.S. Osad'ko, A.V. Naumov, *Inst. for spectroscopy RAS, Russia.* Blinking or intermittency of fluorescence under CW-laser excitation is one of the main features of light emission from single semiconductor quantum dots (QDs). Reasons of this blinking are discussed intensively in literature so far. The main goal of this work is to study the dependence of the average times in On- and Off- states of the luminescence of a single core/shell QDs on the intensity of the continuous laser excitation.

IThG3 • 15:30-16:00 • INVITED
Single molecules explore in real time stress relaxation in drawn polymer films, S. Krause, M. Neumann, M. Fröbe, R. Magerle, and C. von Borczyskowski, *Inst. of Physics and NanoMA, Technische Universität Chemnitz, Germany.* We demonstrate how optical spectroscopy and microscopy can be used to study the coupling of individual fluorescent probe molecules to their embedding polymeric matrix and to an external mechanical stimulus on the single-molecule level.

Hall 2
ICONO-03/4

14:30-16:30
IThH ● Nanophotonics and Plasmonics IV
(ICONO-03/4)—Continued

IThH3 • 15:15-15:30 • ORAL
Experimental observation of the Borrmann effect in one-dimensional photonic crystals in the Laue geometry, V.B. Novikov, A.I. Maydykovskiy, B.I. Mantsyzov, T.V. Murzina, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Optical Borrmann effect in high-contrast 1D porous silica photonic crystals at the Laue diffraction is studied both experimentally and theoretically. Strong differences from the well-known x-ray Borrmann effect are revealed.

IThH4 • 15:30-15:45 • ORAL
Millimeter-scale optical Goos-Hänchen shift in one-dimensional photonic crystals with adiabatically modulated band gap, S.E. Svyakhovskiy, E.A. Kekkonen, A.A. Konovko, A.V. Andreev, T.V. Murzina, *Lomonosov Moscow State Univ., Russia.* Giant Goos-Hänchen shift was predicted and experimentally observed in photonic crystals with exponentially modulated band gap. Photonic crystals of high optical contrast and large number of layers were produced by wet etching of silicon.

IThH5 • 15:45-16:00 • ORAL
Bloch surface waves induced Fano resonance in magneto-optical response of magnetophotonic crystals, I.V. Soboleva, M.N. Romodina, A.I. Musorin, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* The Fano-type resonance in the Faraday rotation spectrum of 1D magnetophotonic crystal is found to be a result of the coupling between the s-polarised Bloch surface wave and the p-polarised waveguided mode of magnetophotonic crystal.

Hall 3
ICONO-04/8

14:30-16:30
IThI ● Nonlinear Optics and Novel Phenomena VIII
(ICONO-04/8)—Continued

IThI3 • 15:15-15:30 • ORAL
Transformation of the LiF supercontinuum spectrum due to accumulation of color centers, S.V. Chekalin, V.O. Kompanets, A.E. Dormidonov, V.P. Kandidov, *Inst. of Spectroscopy RAS, Russia.* Transformation of the spectral-angular supercontinuum distribution and a sharp efficiency decrease of the anti-Stokes band generation due to increase of color centres concentration was observed under filamentation of multiple Mid-IR laser pulses in LiF.

IThI4 • 15:30-15:45 • ORAL
Ionization-induced multiwave mixing and terahertz generation with two-color laser pulses of various frequency ratios, V. A. Kostin, I. D. Laryushin, A. A. Silaev, N. V. Vvedenskii, *Inst. of Applied Physics, RAS, Russia.* We show how the multiwave mixing (or, in other words, generation of combination frequencies) of ionizing two-color laser pulses with various frequency ratios may result in generation of terahertz radiation.

IThI5 • 15:45-16:00 • ORAL
Terahertz generation in composite media with large permanent dipole moment, O. Khasanov, O. Fedotova, G. Rusetsky, V. Gayvoronsky, I. Pritula, and E. Gaižauskas, *Scientific-Practical Material Research Centre, NASB, Minsk.* Terahertz generation in composite medium consisting of nanoparticles with large dipole moment is analysed. Local field effects are considered. It is shown that in such media terahertz generation efficiency can reach of order 2 %..

Hall 4 LAT-04/6	Hall 5	Notes

14:30-16:30
LThC ● Biophotonics and Laser Biomedicine
(LAT-04/6)—Continued

LThC3 • 15:15-15:30 • ORAL
The study of chromatin organization in germinal mammalian oocyte by optical tweezers., M.S. Syrchina, A.V. Aybush, A.A. Ocychenko, A.D. Zalesskiy, G.A. Serobyan, A.N. Kostrov, A.A. Titov, V. A. Nadtochenko, *Semenov Inst. of Chemical Physics, RAS, Russian Federation.* laser tweezers was applied to examine viscoelastic properties of chromatin in germinal vesicles of mammalian oocyte.

LThC4 • 15:30-15:45 • ORAL
Fiber-optic cell-resolved online thermometry in laser-assisted thermogenetics, A.A. Lanin, I.V. Fedotov, Y.G. Ermakova, D.A. Sidorov-Biryukov, A.B. Fedotov, V.V. Belousov, and A.M. Zheltikov, *Lomonosov Moscow State Univ., Russia.* Nitrogen–vacancy centers of diamond coupled with an optical fiber are shown to enable online fiber-format cell-resolved thermometry of thermogenetically activated neurons, facilitating a quantitative analysis of thermogenetic effects, characterization of thermosensitive ion channels, and optimization of laser neurostimulation.

LThC5 • 15:45-16:00 • ORAL
Optical Tweezer on the Base of 4-channel LC modulator for Trapping of Biological Objects, A.V. Korobtsov, S.P. Kotova, N.N. Losevsky, A.M. Mayorova, S.A. Samagin, *P.N. Lebedev Physical Inst. of RAS, Samara Branch, Russia.* The techniques of contour optical traps generation with the use of LC focusator are proposed. Such traps minimize laser radiation effect on the cells center. Results of trapping experiments with biological objects are presented.

Hall 1
ICONO-09/1

14:30-16:30
IThG ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution I
(ICONO-09/1)—Continued

IThG4 • 16:00-16:15 • ORAL
A quantum-kinetic theory in understanding the properties of single light emitters in locally inhomogeneous media, M.G. Gladush, A.V. Naumov, *Inst. of spectroscopy RAS, Russia.* We show how a quantum-kinetic formalism for describing interaction of optical centres with light in a frozen dielectric can meet the concept of local variations of permeability and the effective refractive index in macroscopically homogeneous media

IThG5 • 16:15-16:30 • ORAL
Electronic damage under exposer of strong ultrashort X-ray laser pulse, A. A. Mityureva, V. V. Smirnov, *Saint Petersburg State Univ., Russia.* The photo-damage of the fast electron subsystem of an object is studied on base of developed theoretical method. The results are relevant for atomic resolution coherent imaging with X-ray free electron laser sources.

Hall 2
ICONO-03/4

14:30-16:30
IThH ● Nanophotonics and Plasmonics IV
(ICONO-03/4)—Continued

IThH6 • 16:00-16:15 • ORAL
Femtosecond intrapulse evolution of Faraday rotation in magnetophotonic crystals, A. I. Musorin, M.I. Sharipova, T.V. Dolgova, M. Inoue, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* Time-resolved Faraday effect is studied experimentally in magnetophotonic crystals on a femtosecond timescale. It is shown that temporal behavior of polarization state strongly depends on the pulse wavelength.

IThH7 • 16:15-16:30 • ORAL
Femtosecond dynamics of Tamm plasmon-polaritons relaxation, V.O. Bessonov, B.I. Afinogenov, A.A. Popkova, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* The lifetime of the Tamm plasmon-polariton excited in a 1D photonic-crystal/metal-film structure is experimentally found to vary from 20 fs to 40 fs depending on polarization and incident angle of light.

Hall 3
ICONO-04/8

14:30-16:30
IThI ● Nonlinear Optics and Novel Phenomena VIII
(ICONO-04/8)—Continued

IThI6 • 16:00-16:15 • ORAL
Structural quality assessment of Cu(In,Ga)Se2 thin films for solar cells using their stimulated emission parameters, I. E. Svitsiankou, V. N. Pavlovskii, E. V. Lutsenko, G. P. Yablonskii, A. V. Mudryi, V. D. Zhivulko, O. M. Borodavchenko, M. V. Yakushev, R. W. Martin, *Inst. of Physics, NASB, Belarus.* Pulsed high intensity laser excitation was used to change the radiative recombination mechanism in Cu(In,Ga)Se2 thin films from a below band gap to the interband one. The appearance and parameters of the observed stimulated emission can be used to assess the structural quality of the films for solar cell applications.

IThI7 • 16:15-16:30 • ORAL
Ultrafast dynamics of photoprocesses induced by femtosecond IR laser radiation in iron pentacarbonyl molecules and clusters, D.G. Poydashev, V.O. Kompanets, V.N. Lokhman, S.V. Chekalin and E.A. Ryabov, *Inst. of Spectroscopy, RAS, Russia.* Photoinduced processes in [Fe(CO)5]n clusters and Fe(CO)5 molecules excited by resonant femtosecond IR radiation (~ 5 μm) were studied in a molecular beam. Characteristic rates of these processes were evaluated and theoretically analyzed.

IThI8 • 16:30-16:45 • ORAL
Interaction of High-Intensity Femtosecond Laser Pulses with Gas Clusters: Simultaneous Generation of Terahertz and X-Ray Radiationmolecules and clusters, A. V. Balakin, M.S. Dzhidzhoev, V.M. Gordienko, M.N. Esaulkov, I.A. Zhvaniya, K.A. Ivanov, N.A. Kuzechkin, I.A. Ozheredov, A.B. Savel'ev, P.M. Solyankin, A.P. Shkurinov, *Faculty of Physics and International Laser Center, M.V. Lomonosov Moscow State Univ., Leninskie Gory, Moscow, 119991, Russia, Inst. on Laser and Information Technologies of the Russian Academy of Sciences, Shatura, Moscow region, 140700, Russia, Russia.* We present and discuss a phenomenon of simultaneous generation of THz and X-ray radiation from nano-cluster jet under excitation by high-intensity femtosecond laser pulses. We found that THz and X-ray yield from the gas clusters demonstrate different dependences on the laser pulses duration. The efficiency of terahertz radiation generated from the gas clusters becomes around 5 times greater if the laser pulses of fundamental frequency are mixed in the jet together with the pulses at a double frequency in comparison with a case when the only the fundamental laser pulses with the same total energy are applied. The X-ray radiation yield remains the same in both cases as under the single- and the two-color regime of excitation.

Hall 4 LAT-04/6	Hall 5	Notes

14:30-16:30
LThC ● Biophotonics and Laser Biomedicine
(LAT-04/6)—Continued

LThC6 • 16:00-16:15 • ORAL
QUANTUM MEDICINE: MOLECULAR APPEARANCE, G. A. Zalesskaya, L.G. Astafieva, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* The effect of phototherapy on blood oxygenation and metabolic processes were studied. It was shown that blood irradiation exerts influence on oxygen exchange and formation of reactive oxygen species regulating many processes in living organism.

LThC7 • 16:15-16:30 • ORAL
Simulation of Thermographic IR Images of a Localized Heat Source Hidden in Biological Tissue, A. P. Ivanov, V. V. Barun, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Thermal imager data are simulated at varying power, depth, and dimensions of an internal heat source. The main idea of the paper is to get insight into tissue depth by using observations of tissue surface. The observed quantities are discussed as applied to various inverse problems of source parameters retrieval.

Hall 1 ICONO-09/2	Hall 2 ICONO-03/5	Hall 3

17:00-18:30
IThJ ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution II (ICONO-09/2)
Alfred Meixner, *Inst. of Physical and Theoretical Chemistry, Eberhard Karls Univ., Germany, Chair*

IThJ1 • 17:00-17:30 • INVITED
Photochemistry on single chromophore complexes: towards to single molecule optical memory, M. Pärs, J. Maier, A. Schuller, T. Weller, M. Thelakkat, Jürgen Köhler, *Univ. of Tartu, Inst. of Physics, Estonia.* Ultra-small objects such as, single molecules, atoms or multichromophoric assemblies can be alternatives for building optical devices with novel functionalities beyond the semiconductor technology. Organic photochromic macromolecules are a promising candidates for realizing beyond state of the art molecular electronic, electro-optic and pure optical sensors and devices. We will discuss the proof of principle concepts of "single-molecule optical memory" and „photochromic lock-in detection" of single photochromic molecules.

IThJ2 • 17:30-18:00 • INVITED
Multiparameter nanodiagnostics of complex solids by phononless fluorescence spectromicroscopy of myriad single dye-molecules, A. A. Gorshelev, I.Yu. Eremchev, A. V. Naumov, L. Kador, J. Köhler, *Inst. for spectroscopy RAS, Russia.* The advances of phononless fluorescence spectromicroscopy of myriad single probe molecules embedded in transparent complex solids are overviewed. The unprecedented opportunities and a great potential of the technique for the multiparameter characterization of complex solids on the nanometre scale will be demonstrated

17:00-18:30
IThK ● Nanophotonics and Plasmonics V (ICONO-03/5)
Andrei Lavrinenko, *Technical Univ. of Denmark, Denmark, Chair*

IThK1 • 17:00-17:30 • INVITED
Split-hole resonator: Effective element of nonlinear nanoplasmonics, P.N. Melentiev, A.E. Afanasiev, A.A. Kuzin, V.I. Balykin, *Inst. for Spectroscopy, Russia.* We demonstrate the use of the Split-hole resonator, a new element in nanoplasmonics, as a highly efficient nonlinear optical element for generation of harmonics in visible and UV spectral ranges. Several practical applications are shown.

IThK2 • 17:30-17:45 • ORAL
Interaction of surface plasmon polaritons and acoustic waves in hybrid metal-semiconductor structures, N.E. Khokhlov, G.A. Knyazev, B.A. Glavin, Y.K. Shtykov, O.G. Romanov, V.I.Belotelov, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Hybrid acousto-plasmonic structure for achieving control of surface plasmon polaritons' excitation is considered. It is shown that relative change of the reflectivity can reach several percents for realistic acoustic wave amplitudes.

Hall 4 LAT-04/7	Hall 5	Notes

17:00-18:45
LThD • Biophotonics and Laser Biomedicine (LAT-04/7)
Tatiana Savelieva*, A.M. Prokhorov General Physics Inst., RAS, Russia, Chair*

LThD1 • 17:00-17:15 • ORAL
The development of fiber-optic scaffold for the glioblastoma diagnosis and prevention., Yu. S. Maklygina, A.V. Borodkin, G.M. Yusubalieva, V.B. Loschenov, *A.M. Prokhorov General Physics Inst. RAS, Russia.* The developed fiber-optical scaffolds promote the setting of the glial cells growth and act as a port for delivery of photosensitizers and laser radiation for the purpose of cellular processes monitoring.

LThD2 • 17:15-17:30 • ORAL
The temperature and thermal stresses fields at cornea shape alterations under the ring-shaped laser source., O.I. Baum, A.I. Omelchenko, E.M. Kasianenko, A.V. Bolshunov, V.I. Sipliviy , E.N. Sobol, *Inst. Photonic Technologies of Federal Scientific Research Centre "Crystallography and Photonics" of RAS, 142190, Moscow(Troitsk), Pionerskaya 2, Troitsk, Russia., Russia.* The new laser method for non-ablative correction of cornea shape and eye refraction is presented. For correction of the eye refraction the special ring-shaped laser beam with various ring diameters allows obtaining controllable alterations of the eye refraction. The alteration in the cornea shape in vitro on minipig eyes and in vivo on rabbit eyes have been obtained with the help of ring-shaped source of laser radiation with wave length 1,56 mm. These alterations have axial symmetry without any pathological changes in central part of cornea. At ring-shaped distribution of intensity of laser radiation, the tension and temperature of cornea surface has also ring-shaped distribution that results in deformation of cornea in central part and heating only on periphery. This leads to the absence of any pathological changes in central part of cornea. Theoretical model for calculation of eye refraction has developed to estimate laser settings for desirable changes in the eye refraction.

LThD3 • 17:30-17:45 • ORAL
Thermo mechanical processes at laser normalization of intraocular pressure., O.I. Baum, A.V. Bolshunov, O.V. Khomchik, G.I. Zheltov, O.G. Romanov, E.N. Sobol, *Inst. of Crystallography and Photonics of RAS, Russia.* The theoretical calculations of thermo mechanical stress at novel and innovative technique for IOP normalization based on enhancing role of sclera outflow is presented. This technique creates permeable pathways for water transport as a result of pore system formation under nondestructive thermo mechanical effect of pulsed laser irradiation. The theoretical calculations of thermo mechanical stress showed the area of maximum stress concentration. Space-distribution of stress have confirmed by atomic force microscopy. The experimental results of in vivo experiments in rabbit eye sclera have shown twenty times increase of water permeability. The results of numerical modeling with this newly developed theoretical model are in satisfactory agreement with the experimental data. Clinical trials performed for 36 eyes of 36 patients with primary open angle glaucoma (resistant form) have demonstrated stable normalization of the IOP with one year follow-up observations. The prospects of novel non-invasive technique for glaucoma treatment have been demonstrated.

Hall 1 ICONO-09/2	Hall 2 ICONO-03/5	Hall 3

17:00-18:30
IThJ ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution II
(ICONO-09/2)—Continued

17:00-18:30
IThK ● Nanophotonics and Plasmonics V
(ICONO-03/5)—Continued

IThK3 • 17:45-18:00 • ORAL
Femtosecond laser surface nanostructuring of refractory metals, D.V. Abramov, K.S. Khorkov, D.A. Kochuev, A.A. Lachina, S.M. Arakelian, V.G. Prokoshev, *Stoletovs Vladimir State Univ., Russia.* Refractory metals surface nanostructuring has been accomplished by a femtosecond laser in air and liquid nitrogen environments. A simultaneous formation of ripples and nanorods was registered on the sample surface irradiated by a laser.

IThJ3 • 18:00-18:15 • ORAL
Energy migration in upconversion nanoparticles: Assessment through kinetics analysis, S. Alyatkin, I. Asharchuk, K. Khaydukov, A. Nechaev, Y. Vainer, V. Semchishen, E. Khaydukov, *Inst. for Spectroscopy, Moscow Inst. of Physics and Technology Federal Scientific Research Centre "Crystallography and Photonics" RAS, Russia.* We found a link between the kinetics parameters of upconversion nanoparticles β-NaYF4: Yb3+; Tm3+ and the number of excitation quanta n, necessary for thulium transition. The result is explained via long-continued energy migration among the ytterbium ions.

IThK4 • 18:00-18:15 • ORAL
Gold nanoparticles in toluene for SERS applications, E.V. Shabunya-Klyachkovskaya, E.V. Korza, L.L. Trotsiuk, A.S. Matsukovich, O.S. Kulakovich, *B.I. Stepanov Inst. of Physics, NASB, Belarus.* Gold nanoparticles in toluene have been first suggested for enhancement of Raman scattering by inorganic pigments in paints of real paintings. The haematite and rutile microcrystals have been identified in a beige ground of «Portrait of the young man».

IThJ4 • 18:15-18:30 • ORAL
Influence of pump and probe polarization on recoil-induced resonances, D. Lazebny, A. Taichenachev, V. Yudin, *Institut of Laser Physics SB RAS, Russia.* In our work we described theoretically the most general case of recoil-induced resonances for arbitrary elliptical polarization of fields forming recoil-induced resonances and for arbitrary dipole allowed transition.

IThK5 • 18:15-18:30 • ORAL
Enhanced magneto-optics with Mie-resonant dielectric nanostructures, M.G. Barsukova, A.I. Musorin, A.S. Shorokhov, M.R. Shcherbakov, A.A. Fedyanin, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* We have designed, fabricated and characterized a material with magneto-optical properties enhanced by Mie-type resonances in high-refractive-index nanoparticles coupled to ferromagnetic environment.

Hall 4 LAT-04/7	Hall 5	Notes

17:00-18:45
LThD • Biophotonics and Laser Biomedicine (LAT-04/7)—Continued

LThD4 • 17:45-18:30 • ORAL
Dual channel video fluorescence diagnostic system for intraoperational navigation during protoporphyrin IX photosensitized malignant tumor resection in central neural system, M.V. Loshchenov, A.V. Borodkin, D.A. Golbin, S.A. Gorjainov, P.V. Zelenkov, A.A. Potapov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* In the presented work we have developed a novel neurosurgery fluorescence diagnostic system for navigation in photosesnsitized neural tissues during neurosurgery operations on neural malignant tumors in patients. This system contains a beamsplitter adapter based on a dichroic mirror where white light image goes to a high sensitivity monochrome camera and color image goes to a color camera. Both images are spectrally resolved. Then both images go to processor unit and then displayed on the monitor. In the clinical conditions the presented system indicated all the residual tumors including meningioma, neurinoma, and glioblastoma.

LThD5 • 18:00-18:15 • ORAL
Light Fields in Skin Tissue with Rough Surface, A. P. Ivanov, V. V. Barun, *B.I. Stepanov Inst. of Physics of NASB, Belarus.* Fluence rate inside skin tissue and its diffuse reflectance are analytically simulated. The roughness of skin surface and light refraction at the epidermis and stratum corneum interface are accounted for. Light penetration depth is shown to be independent of the skin relief, whereas the reflectance to increase with roughness variance.

LThD6 • 18:15-18:45 • INVITED
Sapphire Shaped Crystals for Phototheranostics and Combined Anticancer Therapy, I.A. Shikunova, V.V. Volkov, V.N. Kurlov, *Inst. of Solid State Physics RAS (ISSP RAS), Russia.* A new kind of medical instruments and devices for combined laser photodynamic therapy and thermal therapy, laser surgery, fluorescent diagnostics, and cryosurgery based on sapphire shaped crystals are developed.

IThL • 18:30-20:00
Nanophotonics and Plasmonics (ICONO-03): Posters

IThL1
Enhanced Magneto-Optical Kerr effect in One-Dimensional Iron Magnetoplasmonic Crystals, M.I. Sharipova, M.R. Shcherbakov, A.A. Fedyanin, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* The transversal magneto-optical Kerr effect (TKE) spectrum of 1D magnetoplasmonic crystal is found to be enhanced in the region of surface plasmon-polariton (SPP) excitation.

IThL2
Plasmonic enhancement of acousto-optic effect, I.M. Sopko, G.A. Knyazev, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* The acousto-optical interaction of 10,6 μm optical beam and a surface acoustic wave in GaAs prism was enhanced by surface plasmon-polarition induced on metal-air interface in case of prism coupling via method Otto.

IThL3
Dispersion law and damping rate of potential surface waves in photoionized plasma, K.Yu. Vagin, Yu.M. Aliev, S.A. Uryupin, A.A. Frolov, *P.N. Lebedev Physical Inst. of RAS, Russia.* The frequency and damping rate of a potential surface wave in photoionized plasma with different electron temperatures along and across the plasma surface are established. The influence of electron thermal motion along the plasma surface on surface wave properties is similar to a bulk Langmuir wave. Thermal motion across the surface substantially affects the dispersion and increases the damping rate.

IThL4
Light scattering by spherical dielectric nanoparticles with high refractive index near a dielectric substrate, Yu. V. Vladimirova, M. I. Tribelsky, V. N. Zadkov, *International Laser Center & Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Scattering of light by subwavelength spatially homogeneous spherical dielectric nanoparticles with a high refractive index and low losses in non-magnetic and non-absorbing media near a dielectric substrate is studied in detail. It is shown theoretically that the proper use of coherent effects between the electric and magnetic dipole resonances, which produce anomalous scattering effects, allows to control the scattering diagram of the nanoparticles and optimal conditions for forward scattering have been derived.

IThL5
Controlled synthesis and optical properties of plasmonic nanoparticles, A.A. Lotin, O.A. Novodvorsky, L.S. Parshina, O.D. Khramova, V.A. Mikhalevsky, E.A. Cherebilo, *ILIT Branch of the Federal Scientific Center "Crystallography and Photonics" RAS, Russia.* The gold and silver plasmon nanoparticles have been synthesized on the c-sapphire and silica substrates by the pulsed laser deposition method. It has been demonstrated that the variation of the thickness of as-grown gold and silver films permits producing the plasmon nanoparticles with different size and density. It provides the retuning of the frequency of surface plasmon resonance in wide spectral region.

IThL6
Dispersion laws of the two-dimensional cavity magnetoexciton-polaritons, S.A. Moskalenko, I.V. Podlesny, E.V. Dumanov, M.A. Liberman, B.V. Novikov, *Inst. of Applied Physics, Academy of Sciences of Moldova, Russia.* The energy spectrum of the 2D cavity magnetoexciton-polaritons has been investigated.

IThL7
Laser-induced interaction of multilevel quantum dots, A. A. Glushkov, A.S. Tsipotan, A.S. Aleksandrovsky, V.V Slabko, *Siberian Federal Univ., Russia.* A theoretical model is developed for describing the laser-induced interaction of multilevel quantum dots(QDs). Spectral dependencies of interaction energy are calculated for QDs pair, for cases of identical QDs and those with differing transition wavelengths.

IThL8
Multilayered gold nanoshells with ideal absorption for plasmonic photothermal therapy, V.I. Zakomirnyi, I.L. Rasskazov, V.S. Gerasimov, A.E. Ershov, S.V. Karpov, S.P. Polyutov, *Siberian Federal Univ., Russia.* In this paper we study multilayered spherical nanoparticles with ideal absorption for biomedical applications. The core of such particles consists of Si, SiO2 or alternative plasmonic materials, such as zinc oxide doped with aluminum, gallium and indium tin oxide whereas the outer shell consists of gold. We develop the algorithm for finding optimal geometry of ideally absorbing Au nanoparticles taking into account the quantum size effect that in multilayered metallic nanoshells plays a significant role.

IThL9
Microlens arrays based on epsilon-near-zero metamaterial, S. Kozik, V. Belyi, *B.I.Stepanov Inst. of Physics, NASB, Belarus.* Concept of fabricating microlens array based on self-assembled nanoparticle templates has been presented. Focusing effect of microlens employing properties of near zero effective electric permittivity of specially designed substrate has been demonstrated numerically.

IThL10
Tuning of the Fano resonance in hybrid oligomers via fs-laser reshaping at nanoscale, S.I. Lepeshov, D.A. Zuev, S.V. Makarov, A.E. Miroshnichenko, A.E. Krasnok, P.A. Belov, *ITMO Univ., Russia.* Here, we propose a novel type of hybrid oligomers consisting of asymmetric metal-dielectric nanodimers which have magnetic Fano resonances in the visible range. We numerically show that the profile of this Fano resonance and its position can be changed by precise femtosecond laser reshaping of metal nanoparticles in the nanodimers.

IThL11
Interaction of the two-dimensional magnetoexcitons under the influence of the Rashba spin-orbit coupling and Zeeman splitting effects, S.A. Moskalenko, E.V. Dumanov, I.V. Podlesny, M.A. Liberman, *Inst. of Applied Physics, ASM, Moldova.* The interaction between the two-dimensional magnetoexcitons with in-plane wave vector k=0 taking into account the influence of the excited Landau levels (ELLs) and of the external perpendicular electric field parallel with the strong magnetic field were investigated

IThL12
Flat lens with subwavelength resolution, N. Khilo, A. Agashkov, N. Kazak, S. Kozik, *The Inst. of Physics, NASB, Belarus.* It is shown that flat lenses made of the subwavelength metal-dielectric structure are more energy efficient in ultraviolet and violet spectrum. For the first time the angular dependence of phase shift has been directly measured

IThL13
Surface plasmon resonance of Au nanoparticles in the vicinity of the melting temperature, A. E. Ershov, V. S. Gerasimov, I. L. Rasskazov, V. I. Zakomirnyi, A. P. Gavrilyuk, S. V. Karpov, S. P. Polyutov, *Siberian Federal Univ., Russia.* We have demonstrated experimentally the significant suppression of resonant properties of single Au nanoparticles at the surface plasmon frequency during heating and subsequent transition to the liquid state.

IThL14
Thermal effects in optical plasmonic waveguides, A. E. Ershov, V. S. Gerasimov, I. L. Rasskazov, V. I. Zakomirnyi, A. P. Gavrilyuk, S. V. Karpov, S. P. Polyutov, *Kirensky Inst. of Physics, SB RAS, Russia.* We investigate the influence of the heating of the optical plasmonic waveguide in the form of chains of the plasmonic nanoparticles by laser radiation on its transmission properties.

IThL!5
Optical properties of silicon particles obtained in liquid by CW-laser ablation, S.M. Arakelian, A.B. Evlukhin, S.V.Kutrovskaya, A.O. Kucherik, A.V. Osipov, *Stoletov Vladimir State Univ., Russia.* We have studied that spherical silicon nanoparticles demonstrate the unique optical properties due to the Mie resonance. The orderly deposition of such particles allows to create metasurfaces for controllable reflection and transmission properties

IThL16
Effect of focusing the laser beam on the radiation gaussian forces acting on the transparent nanoparticle, A.A. Afanas'ev, L.S. Gaida, A.Ch. Svistun, *Kupala State Univ. of Grodno, Belarus.* Radiation forces acting on a transparent spherical nanoparticle in the field of a focused Gaussian laser beam are studied theoretically in the Rayleigh scattering regime. The expressions for the scattering force and the longitudinal component of the gradient force. The resultant force acting on a nanoparticle located in the centre of a laser beam is found. The parameters of the focused beam and optical properties of the nanoparticle for which the longitudinal component of the gradient force exceeds the scattering force are determined. The possibility of capturing and localizing the nanoparticles, as well as their spatial separation and with different sizes (or) optical properties.

IThL17
Application of scanning near-field optical microscopy for the characterization of optical elements, D. S. Filimonenko, V. M. Yasinskii, *Stepanov Inst. of Physics, NASB, Belarus.* The methods of scanning near-field optical microscopy (SNOM) are used to study the distribution of light intensity in the focal spot of different optical elements and reveal their aberrations.

IThL18
Surface Enhanced CARS from Gold Nanoparticle-Immobilized Molecules at Cerium Dioxide/Aluminium Film, A.D. Brozhek, V.I. Fabelinsky, D.N. Kozlov, S.N. Orlov, Y.N. Polivanov, I.A. Shcherbakov, V.V. Smirnov, K.A. Vereschagin, G.M. Arzumanyan, K.Z. Mamatkulov, A.N. Lagarkov, I.A. Ryzhikov, A.K. Sarychev, I.A. Budashov, I.N. Kurochkin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Highly-contrast epi-SECARS micro-images of Au-nanoparticle-immobilized reporter molecule distribution at SERS-active junctions, based on nanoparticles spread over a nanostructured CeO2 dielectric film, deposited to an Al layer, have been recorded at picosecond excitation in NIR spectral range.

IThL19
Research of the spectra of colloidal solutions of silver nanoparticles produced by laser ablation method under different parameters of the laser radiation and the liquid, M.S. Baranov, V.N. Khramov, E.V. Khaydukov, *Volgograd State Univ., Inst. of Physics and Technology, Russia.* As a result of laser ablation in a liquid at the different experimental conditions (parameters duration of laser radiation and the liquid in which the ablation changed) of a silver nanoparticles is obtained. Spectral characteristics of the resulting solutions are investigated. On the basis of the recorded spectra of colloidal solutions is possible indirect

determination of the nanoparticle size, depending on the duration of the laser pulse ablation.

IThL20
Nanoparticle motion under the action of light pressure in the field of a Gaussian laser beam, A. A. Afanas'ev, L. S. Gaida, D. V. Novitsky, E. V. Matuk, *Kupala State Univ. of Grodno, Belarus.* We study motion of a spherical transparent nanoparticle under the influence of radiation (gradient and scattering) forces in the field of a Gaussian laser beam. Appropriate solutions of the Langevin equation are derived and analyzed.

IThL21
Plasmon-assisted enhancement of spontaneous and stimulated emission of the dye thin films, N. A. Toropov, A. N. Kamalieva, and T. A. Vartanyan, *ITMO Univ., Russia.* Thin films of coumarin dye covering a layer of the metal nanoparticles were studied experimentally. Strong interaction between localized plasmons and molecular excitations result to spontaneous emission enhancement and laser-like narrowing of their fluorescent spectra.

IThL22
Observation of the second-harmonic generation from silicon nanodisks with electric and magnetic resonances, M.K. Kroychuk, E.V. Melik-Gaykazyan, A.S. Shorokhov, V.V. Zubyuk, Duk-Yong Choi, T.V. Dolgova, M.R. Shcherbakov, D.N. Neshev, A.A. Fedyanin, Y.S. Kivshar, *Lomonosov Moscow State Univ., Russia.* We demonstrate experimentally and numerically the enhancement of the second-harmonic generation from silicon nanodisks. The process efficiency is shown to depend on the spectral positions of the dipolar Mie-type resonances excited in each nanodisk.

IThL23
Effect of silver nanoparticles on excitons in InAs epitaxial quantum dots, N. A. Toropov, P. V. Gladskikh, I. A. Gladskikh, V. V. Preobrazhenskiy, M. A. Putyato, B. R. Semyagin, A. Kosarev, A. A. Kondikov, V. V. Chaldyshev, T. A. Vartanyan, *ITMO Univ., Russia.* Method for preparation of silver nanoparticles on the GaAs substrate with MBE grown InAs quantum dots is presented. Results of spectral investigations of plasmon resonance effect on quantum dots is described.

IThL24
Metal planar structues deposited on the silicon surface by atomic-force nanolitography, I. Skryabin, S. Kutrovskaya, A. Kucherik, A. Shagurina, S. Arakelian, *Stoletov Vladimir State Univ., Russia.* The method of electro-induced deposition of silver particles on the silicon surface is offered. The formation of planar structures for photonics is discussed.

IThL25
Tunable transverse magneto-optical Kerr effect in 2D gold-garnet nanogratings, G.A. Shein, A.I. Musorin, A.V. Chetvertukhin, T.V. Dolgova, H. Uchida, M. Inoue, A.A. Fedyanin, *Lomonosov Moscow State Univ., Russia.* Transverse magneto-optical Kerr effect is experimentally studied in two-dimensional magnetoplasmonic crystals. Optical response can be accurately controlled by an azimuthal angle of the sample. Corresponding tuning of the magneto-optical effect is observed.

IThL26
Hydrophilic quantum dots in cancer diagnostics, I.G. Motevich, N.D. Strekal, A.V. Shulha, S.A. Maskevich, *Yanka Kupala Grodno State Univ., Belarus.* Identify the spectral responses of the stromal and parenchymal environment of biological tissues with different levels of pathology: benign and malignant neoplasms and sigmoid colonic crypts, staining by hydrophilic quantum dots CdSe/ZnS.

IThL27
Self-action effects in GaAs metasurfaces with magnetic Mie-type resonances, A.N. Fedotova, P.P. Vabishchevich, M.R. Shcherbakov, S. Liu, I. Staude, I. Brener, A.A. Fedyanin, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* In this paper, we report on free-carrier-induced self-action in gallium arsenide nanodisk arrays enhanced by localized magnetic dipolar Mie-type resonances.

IThL28
Magnetooptical effects in plasmonic quasicrystals, N.E. Khokhlov, Achanta Venu Gopal, N.E. Gusev, A.N. Kalish, V.I. Belotelov, *Russian Quantum Center, Russia.* We investigate magnetooptical effects in plasmonic quasicrystals formed by a uniform magnetic dielectric and a metallic lattice. The Faraday effect demonstrate broadband enhancement, while the transverse Kerr effect is enhanced within a narrower band.

IThL29
Evolution of surface plasmon polariton wave in a thin metal film: the modulation instability effect, S. Moiseev, D. Korobko, I. Zolotovskii, A. Fotiadi, *Ulyanovsk State Univ., Russia.* The modulation instability development of intensive surface plasmon polariton wave in a thin metal film is studied. It is shown both analytically and numerically that the modulation instability effect can give rise to spatial redistribution and longitudinal localization of surface plasmon polariton wave energy in subwavelength scale.

IThL30
Spectral manifestations of photochromic transformations of composite nanostructures, G. Vasilyuk, S. Maskevich, N. Strekal, A. Lavysh, V. Minkin, B. Lukyanov, A. Starikov, *Yanka Kupala Grodno State Univ., Belarus.* The results of the comprehensive study indicate manifestation of photochromic properties by molecules in the solid state on quartz, and in the presence of a nanostructured metal surface. Manifestation of photochromism is reflected both in the absorbance spectra, and in the SERS spectra (the reversible photo-induced changes of the relative intensity of the SERS bands related to the vibrations of bond involved in the reversible photoisomerization reaction were detected)

IThM • 18:30-20:00
Nonlinear Optics and Novel Phenomena (ICONO-04): Posters

IThM1
Coherent excitation of nanoparticles ensembles vibrations in gigahertz and terahertz range, A.D. Kudryavtseva, M.A. Strokov, N.V. Tcherniega, K.I. Zemskov, *P.N.Lebedev Physical Inst., RAS, Russia.* Stimulated low-frequency Raman scattering, caused by laser pulses interaction with acoustic vibrations of nanoparticles, has been studied in the wide range of nanoobjects both in high-ordered and random materials, in inorganic and organic substances.

IThM2
Slowdown and trapping of microparicles by light fields amplifying over time, A. Ch. Izmailov, *Inst. of Physics of Azerbaijan, NAS, Azerbaijan.* New methods are proposed for slowdown and trapping of microparticles in the high vacuum by nonresonance laser fields which induce deepening over time potentials wells with fixed spatial configurations. These methods may be applied in high resolution spectroscopy of various particles including atoms and molecules.

IThM3
Single-cycle THz generation from nonlinear interaction of femtosecond laser pulses and directed metallic micro-particle arrays, D. A. Fadeev, I. V. Oladyshkin, V. A. Mironov, *Inst. of Applied Physics RAS, Russia.* Numerical study of terahertz generation from dense plasma objects with different shapes is presented. New idea of effective THz generation from directed array of micro-particles is proposed.

IThM4
Femtosecond filamentation of double-charged optical vortex in fused silica, E.V. Vasilyev, S.A. Shlenov, *Faculty of Physics and International Laser Center, Lomonosov Moscow State Univ., Russia.* Self-action of double-charged optical vortex is numerically analyzed. It is shown a formation of cylindrical filament in fused silica. Analysis of pulse spatiotemporal dynamics and evolution of frequency-angular spectrum is performed.

IThM5
Second optical harmonic generation in ferroelectrics under femtosecond optical pumping, M. K. Tarabrin, V. A. Lazarev, S. O. Leonov, V. S. Bobkova, V. S. Gorelik, *Bauman Moscow State Technical Univ., Russia.* The second optical harmonic intensity dependence upon incident radiation of femtosecond laser is measured for different ferroelectrics: barium titanate in the form of ceramics, barium titanate in a water colloidal suspension and sodium nitrite.

IThM6
Two-photon absorption in graphene oxide/silver nanoparticles composite material, A. Gartman, S. Svyakhovskiy, S. Evlashin, N. Mitetelo, A. Bykov, A. Maydykovskiy, T. Murzina, *Lomonosov Moscow State Univ., Russia.* Single-beam open aperture z-scan technique was used to determine two-photon absorption coefficient of solvent—produced graphene oxide (GO) film decorated with silver nanoparticles (AgNP) in the spectral vicinity of the plasmon resonance.

IThM7
Spin-to-orbital angular momentum conversion for Bessel light beams propagating in electrically controlled liquid crystal cell, D. Gorbach, S. Nazarov, S. Kurilkina, A. Tolstik, *Belarusian State Univ., Belarus.* It is shown theoretically and experimentally that the liquid crystal cell can provide spin-to-orbital transformation in Bessel beams. It is grounded that, by changing the electric strength applied to the cell there arise the possibility of controlling with a high-speed switching the value of the total angular momentum and, hence, spatial structure for the emerging field.

IThM8
Polarization-Resolved Second Harmonic Generation Microscopy in Studies of Chirality of Planar G-Shaped Nanostructures, E.A. Mamonov, I.A. Kolmychek, S.A. Magnitskiy, T.V. Murzina, *Lomonosov Moscow State Univ., Russia.* Polarization-resolved second harmonic generation (SHG) microscopy is applied to study planar chiral nanostructures. It was found that this technique reveals chirality of localized SHG sources within the structures.

IThM9
Numerical simulation of the optical wave phase front controller based on MEMS structures, A.V. Popov, G.D. Demin, V.V. Svetikov, N.A. Djuzhev, *National Research Univ. of Electronic Technology (MIET), Russia.* The results of numerical modeling for two types of membrane deformable mirror (DM) on the basis of silicon microelectromechanical structures (MEMS), the first one with controlled membrane (OKO Technologies) and the second one with segmented membrane (Boston Micromachines Corp.), are presented. Membrane mirrors with different membrane materials (Si, SiO2, Si3N4) were analyzed, whereupon the optimal thickness, material and frequency characteristics for these DM structures are defined.

IThM10
Resonant reflection by active thin layer, V.A. Yurevich, Yu.V. Yurevich, E.V. Timoschenko, *Mogilev State Univ. of Food Technologies, Belarus.* In the ultra-thin layer approximation in semi-classical model of interaction the computation of resonant reflection of an ultrashort pulse by dense resonant film is carried out. We used the model parameters of semiconductor quantum-size structures.

IThM11
High-quality enhanced absorption resonances in a buffer-gas-filled cell for quantum magnetometry, D.V. Brazhnikov, A.V. Taichenachev, V.I. Yudin, Ch. Andreeva, V.M. Entin, I.I. Ryabtsev, *Inst. of Laser Physics SB RAS, Russia.* New magneto-optical configuration for observation of high-quality enhanced absorption resonances is studied. Theory predicts that 80-98% contrast at 1-kHz width of the nonlinear resonance can be achieved. Preliminary experiments have been also carried out.

IThM12
Thermo-optics in nonlinear-optical parametric conversion: exact solutions, approximate solutions, estimates, E.V. Moiseenko, A.V. Shepelev, *I.M. Gubkin Russian State Univ. of Oil and Gas, Russia.* During nonlinear-optical parametric conversion heat-related effects considerably influencing conversion process occur. Versatile methods for numerical calculation of temperature distribution and thermo-optical parameters are developed. Numerical results for the most popular methods are presented.

IThM13
Small-scale disturbances of the phase at interference of broadband laser fields, O.M. Vokhnik, V.I. Odintsov, *Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Numerical simulation is used to determine and study sharp small-scale disturbances of the phase of function of mutual coherence of two broadband laser beams and their manifestation in the interference pattern. An analytical interpretation of the small-scale disturbances is presented, and the probability of their appearance is estimated.

IThM14
Fiber sources of subcycle pulses in the mid-infrared: numerical modeling, D.V. Meshchankin, A.A. Voronin, and A.M. Zheltikov, *Lomonosov Moscow State Univ., Russia.* Numerical simulations reveal physical scenarios whereby ultrashort mid-infrared pulses can be compressed to subcycle pulse widths using nonlinear-optical field transformations in chalcogenide photonic-crystal fibers.

IThM15
Spectroscopic study of rare-earth gallium borates with huntite-type structure, E.A. Dobretsova, N.N. Kuz'min, K.N. Boldyrev, *Inst. for spectroscopy, RAS, Russia.* Crystals of the rare-earth gallium borates RGa3(BO3)4, where R = Nd, Sm - Er, or Y, were grown by the flux method. Luminescence of RE gallium borates was studied at room temperature. The scheme of crystal-field energy levels of RE3+ in REGa3(BO3)4 was built on the basis of the temperature-dependent optical transmission measurements combined with the luminescence data. The measured UV absorption edge for REGa3(BO3)4 is at about 300 nm. This makes rare-earth gallium borates a promising material for blue and ultraviolet lasers, including a self-frequency mixing and self-frequency doubling lasers.

IThM16
The hyper-Raman scattering of light in CdS under two-photon excitation near resonance with the $A_{n=2}$ and $B_{n=1}$ exciton levels, L.E. Semenova, *A.M. Prokhorov General Physics Institut, RAS, Russia.* The hyper-Raman scattering of light by LO-phonons in a CdS crystal of the wurtzite structure is theoretically investigated when the doubled frequency of incident radiation is near resonance with the $A_{n=2}$ and $B_{n=1}$ exciton levels.

IThM17
Backward-wave spontaneous parametric down-converiosn in a periodically poled KTP waveguide, I. Z. Latypov, A. A. Shukhin, D. O. Akatiev, A. V. Shkalikov and A. A. Kalachev, *Zavoisky Physical-Technical Inst., Russia.* Backward-wave spontaneous parametric down-conversion (SPDC) in a periodically poled potassium titanyl phosphate (KTP) waveguide was first observed experimentally and studied in the context of creating narrow-band heralded sources of single-photon states. Correlation and spectral characteristics of spontaneous parametric down-conversion is measured.

IThM18
Raman frequency conversion of diode-pumped Nd:YAG laser radiation into the yellow-orange spectral region, R. Chulkov, V. Markevich, V. Orlovich, M. El-Desouki, *B.I. Stepanov Inst. of Physics, NASB, Russia.* A linear and folded cavity configurations of Raman shifters on potassium gadolinium tungstate and barium nitrate have been considered. Excited by frequency-doubled pulses of an actively Q-switched diode-pumped Nd:YAG laser, the 1st, 2nd, and 3rd Stokes generation is demonstrated on wavelengths at 559, 563, 588, 599, 621, and 639 nm with the output pulse energies of up to 27 mJ and conversion efficiencies of up to 35%.

IThM19
Structure of few-cycle pulse reflection spectrum from a thin layer of dense resonance medium, G.A. Rusetsky, V. M. Kolesenko, *SSPA "Scientific-Practical Material Research Centre of NAS of Belarus", Belarus.* The reflection spectrum of few-cycle pulse from a thin layer of dense resonant two- level medium was numerically and analytically studied. The dominant role of the pulse shape with respect to local field effects and Bloch-Siegert shift in the formation of reflected signal spectrum has been demonstrated.

IThM20
Ultrafast nonlinear properties of bulk semiconductors and quantum dots, A.G. Shmelev, A.V. Leontiev, D.K. Zharkov, V.G. Nikiforov, V.S. Lobkov, *Zavoisky Physical-Technical Inst. of the Kazan Scientific Center of the Russian Academy of Sciences, Russia.* Nonlinear optical properties of CdSe-CdS quantum dots and the bulk CdS crystal were probed by fs-pulses at 800 nm and 1050 nm. QDs show fast decay about 0.5 ps, while bulk crystal shows relatively long decay about 90 ps.

IThM21
Z-scan studies of promising crystals and glasses, A. I. Vodchits, V. A. Orlovich, A.S. Grabtchikov, V. I. Dashkevich, N. V. Nikonorov, and P. S. Shirshnev, *Stepanov Inst. of Physics, NASB, Belarus.* Nonlinear optical properties of KGW, KGW:Eu3+, Ba(NO3)2, BaWO4, PbMoO4, CdWO4 crystals, and borosilicate glasses with nanoparticles of CuCl, CuBr, Ag, and Ag+ have been studied using Z-scan method with picosecond laser pulses.

IThM22
Functional possibilities of nonlinear crystals for frequency conversion, S. G. Grechin, P. P. Nikolaev, Yu. D. Arapov, I. V. Kasyanov, *Bauman Moscow State Technical Univ., Russia.* The methods and results of the complex analysis of phase-matching and nonlinear properties of crystals that determine their functional possibilities for solving various problems of nonlinear frequency conversion of laser radiation are presented

IThM23
Asymmetrical temperature dependence for SHG effi-ciency of focused laser radiation caused by joint col-linear and non-collinear interactions, A.L. Bondarenko, S.G. Grechin, D.G. Kochiev, A.N. Sharikov., *Bauman Moscow State Technical Univ., Russia.* The paper presents the peculiarities of the temperature dependence for the second harmonic generation efficiency of focusing laser radiation. It is shown that an asymmetry of the dependence is the result of the vector phase-matching process near the crystal axis.

IThM24
The growth of carbonic and silicon dioxide films on the surface of ionic crystals upon decomposition of adsorbed molecules by IR femtosecond laser radiation, S.V. Chekalin, I.A. Dorofeev, V.O. Kompanets, V.B. Laptev, S.V. Pigul'sky and E.A. Ryabov, *Inst. of spectroscopy of RAS, Russia.* The growth of films of oxidized graphite and silicon was found resulted from decomposition of organic and silicon-containing molecules on the surface of ionic crystals under IR femtosecond radiation of moderate intensity ~10^{11} W/cm^2 without molecular decomposition in the gas phase

IThM25
Nonlinear oscillations of linear spring pendulum, N.S. Shtatskaya, P.I. Khadzhi, *Dniester State Univ., Moldova.* We showed that the linear spring pendulum can exhibit the nonlinear periodic oscillations due to the geometric nonlinearity. The period and amplitude of these oscillations depend on the initial displacement and velocity of body.

IThM26
Photoinduced dynamics in LiYxLu(1-x)F4 through transient lens spectroscopy, A.V. Leontyev, L.A. Nurtdinova, S.L. Korableva, *Zavoisky Physical-Technical Inst., Russia.* LiYxLu(1-x)F4 (x = 0..1) crystals are widely known active media for solid state UV lasers. We have evaluated Ce3+-lattice energy exchange time constant and photoinduced carriers lifetime in two-color transient lens pump-probe experiment

IThM27
Superradiation in thin inverse planar layer, V.A. Yurevich, Yu.V. Yurevich, *Mogilev State Univ. of Food Technologies, Belarus.* The solution of modification of semiclassical Maxwell-Bloch equations for superradiation is given. In theoretical model the line broadening, typical for the dense resonance media, owing to a dipole - dipole interaction, and also influence of quasiresonant transitions on polarizability is considered.

IThM28
The optical nutation in exciton range of spectrum under the action of strong pump pulse at M-band of luminescence, L.Yu. Nadkin, D.A. Markov, P.I. Khadzhi, *Dniester State Univ., Moldova.* We present the results of investigation of the phenomenon of optical nutation in the exciton range of spectrum. It is shown that the dispersion law contains three branches. Depending on parameters the branches of the dispersion law can approach each other and cross. It is shown that in behavior of concentration of excitons and photons the oscillatory regime exists. Frequencies and amplitudes of oscillations depend on the distances between branches of the dispersion law. Splitting of exciton level under the action of the strong pump pulse predicted.

IThM29
On the mechanisms of THz radiation generation on metal surfaces, S.G. Bezhanov, S.A. Uryupin, *P.N. Lebedev Physical Inst., RAS, Russia.* We present time-domain solution of the equations describing generation of low-frequency radiation under conditions of fast heating by

absorption of non-damaging femtosecond optical pulse. Under typical experimental conditions both drag current and thermal gradient give similar contribution to the THz signal.

IThM30
Surface enhanced CARS from gold nanoparticle-immobilized molecules at cerium dioxide/aluminium film, A.D. Brozhek, V.I. Fabelinsky, D.N. Kozlov, S.N. Orlov, Y.N. Polivanov, I.A. Shcherbakov, V.V. Smirnov, K.A. Vereschagin, G.M. Arzumanyan, K.Z. Mamatkulov, A.N. Lagarkov, I.A. Ryzhikov, A.K. Sarychev, I.A. Budashov, I.N. Kurochkin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Highly-contrast epi-SECARS micro-images of Au-nanoparticle-immobilized reporter molecule distribution at SERS-active junctions, based on nanoparticles spread over a nanostructured CeO2 dielectric film, deposited to an Al layer, have been recorded at picosecond excitation in NIR spectral range.

IThM31
Picosecond SRS in Dielectric Media, A. I. Vodchits, V. A. Orlovich, P. A. Apanasevich, V. S. Gorelik, *B. I. Stepanov Inst. of Physics, NASB, Belarus.* Stimulated Raman scattering in dielectric media (H2O, D2O and others) was studied at picosecond excitation. Raman lines due to libration, translation, and vibration modes were observed. Possibility of transient phase transition in water is confirmed.

IThM32
Selective spectroscopy of librational response in acetonitrile through optical Kerr effect, D K Zharkov, A G Shmelev, A V Leontyev, V G Nikiforov, V S Lobkov, *Zavoisky Physical - Technical Inst., Russia.* We report the experiment results and modeling on selective spectroscopy of librational response in acetonitrile at room temperature. We have used the two-pulse pumping scheme and have achieved the suppression of the Raman-active vibrational and orientational responses

IThM33
Two-photon absorption in As35S65 glass, D.S. Chunaev, G.E. Snopatin, V.G. Plotnichenko, A.Ya. Karasik, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Two-photon nonlinear absorption coefficient in As35S65 glass at 1047 nm wavelength was measured. Induced linear absorption upon two-photon excitation was observed using cw probe radiation. Lifetime of induced absorption is ~2 ms.

IThM34
Spin-orbital Interaction under Acousto-optic Diffraction of Vortex Bessel Beams, V.N. Belyi, P. A. Khilo, N. S. Kazak, N. A. Khilo, *Gomel State Technical Univ., Belarus.* Generation of wavefront phase dislocations of Bessel light beams at acousto-optic diffraction in crystals has been investigated. The change of the phase dislocation order is a result of the spin-orbital interaction of vortex Bessel beams

IThM35
Radiation linewidth of a multicolor optical parametric oscillator, M.Yu. Saygin, A.S. Chirkin, *Lomonosov Moscow State Univ., Russia.* We investigate the coherence properties of radiation, generated in a multicolor OPO, based on simultaneous down- and up-conversion processes. The analytical expression for the linewidth has been derived.

IThM36
Fingerprints of the electron band structure from intraband high-harmonic generation in solids, A.A. Lanin, E.A. Stepanov, A.B. Fedotov, and A.M. Zheltikov, *Lomonosov Moscow State Univ., Russia.* Below-the-bandgap high-order harmonics generated by ultrashort mid-infrared pulses are shown to detect the fingerprints of the electron band structure in bulk solids.

IThM37
Photovoltaic response of doped lithium niobate at incoherent background illumination, A. Pustozerov, V. Ryabchenok, and V. Shandarov, *Tomsk State Univ. of Control Systems and Radioelectronics, Russia.* Refractive index changes of Fe-doped lithium niobate sample via incoherent illumination of different wavelengths are studied due to the interference of coherent light beam reflected from entrance and exit facets of the crystal sample.

IThM38
Dissociation dynamics of iron pentacarbonyl clusters induced by excitation of electronic states by femtosecond UV radiation, D.G. Poydashev, V.O. Kompanets, V.N. Lokhman, S.V. Chekalin and E.A. Ryabov, *Inst. of Spectroscopy, RAS, Russia.* Dissociation dynamics of [Fe(CO)5]n clusters excited by femtosecond UV radiation below the ionization thershold was studied in a molecular beam. Possible physical effects leading to the cluster decay are discussed and supported by model calculations.

IThM39
Nonlinear nonsymmetric quasisurface waves in symmetric three–Layer structure with left-handed film, O.V. Korovai, A.V. Corovai, P.I. Khadzhi, *T.G. Shevchenko Pridnestrovian State Univ., Moldova.* We study the theory of nonsymmetric nonlinear s–polarized quasisurface waves, propagating along the plane interface of symmetric three–layer structure with linear left-handed film. The behavior of dispersion laws depends on the core thickness.

IThM40
Diffraction of laser beams on periodically poled domain structures in lithium niobate crystals, S.M. Shandarov, A.E. Mandel, A.V. Andrianova, M.V. Borodin, G.I. Bolshanin, A.Yu. Kim, S.V. Smirnov, A.R. Akhmatkhanov, V.Yu. Shur, *Tomsk State Univ. of Control Systems and Radioelectronics, Russia.* We present experimental and theoretical study of diffraction of laser radiation with a wavelength of 655 nm on a periodic domain structure with 180-degree domain Y-walls and spatial period of 9.43 μm, which was formed in a MgO:LiNbO3 crystal by electric poling method.

IThM41
Waveguide and diffraction properties of optically induced elements in photorefractive surface layers of lithium niobate, A. D. Bezpaly, A. O. Verkhoturov, V. M. Shandarov, *Tomsk State Univ. og Control Systems and Radioelectronics, Russia.* Both, channel waveguide and 1D diffraction elements are induced by laser radiation with wavelengths 450 and 532 nm within lithium niobate surface layers doped with photorefractive impurities. Their properties have been studied with light diffraction.

IThM42
Formation of photonic structures in a bulk of lithium niobate by Bessel-like optical beams, A. Inyushov, P. Safronova, I. Trushnikov, V. Shandarov, *Tomsk State Univ. of Control Systems and Radioelectronics, Russia.* 1D and 2D Bessel-like beams are formed from Gaussian laser beams using the amplitude masks. These diffraction-free light fields with wavelengths 450 and 532 nm form within lithium niobate the nonlinear photonic waveguide and diffraction structures.

IThM43
Light bullet conical emission in fluorides, A.E. Dormidonov, V.P. Kandidov, V.O. Kompanets, S.V. Chekalin, *Lomonosov Moscow State Univ., Russia.* Conical emission of supercontinuum is studied experimentally and numerically in the single filament regime of Mid-IR (1.9–3.8 μm) femtosecond laser pulse in different fluorides crystals. It is shown that the formation of narrow-band visible rings is a result of the interference of the supercontinuum components in the anomalous group velocity dispersion regime.

IThM44
Complex structure of a saturated absorption resonance and the probe beam method, T. V. Radina, *Saint Petersburg State Univ., Russia.* We discuss a new approach to the genesis of resonances of intensities which are accompanied by resonances of the refraction index for two waves in a nonlinear medium.

IThN • 18:30-20:00
Symposium "Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution (ICONO-09): Posters

IThN1
Statistical processing of single-molecule sensing of local fields in dye-doped solid films, A.V. Golovanova, T.A. Anikushina, M.G. Gladush, A.A. Gorshelev, I.Y. Eremchev, A.V. Naumov, L. Kador, J. Köhler, *Moscow State Pedagogical Univ., Russia.* We describe the step-by-step algorithm and the results of mapping of the local fields and the effective refractive index in a frozen solid film. An estimation of the zone attributed to the effective local values is given.

IThN2
Aberration analysis of optical systems containing acousto-optical elements, V.I. Batshev, A.S. Machikhin, V.E. Pozhar, L.I. Burmak, *«Scientific and Technological Center of Unique Instrumentation» RAS, Russia.* A method of aberration analysis of optical systems containing acousto-optical imaging filters is proposed. It is based on integration of the analytical formulas for image transmission under light diffraction via ultrasonic waves in uniaxial crystals into optical design software.

IThN3
The generation of rotating two-lobe light fields for nanoscopy, D.V. Prokopova, S.P. Kotova, N.N. Losevsky, E.V. Razueva, *Lebedev Physical Inst., Samara National Research Univ., Russia.* The results on the formation of rotating two-lobe light fields on the base of the spiral beams optics are presented. Such fields are of interest for determination of the depth of bedding of the emitting nano-sized objects.

IThN4
Hollow-tip photoelectron scanning microscopy, B.N. Mironov, S.A. Aseyev, A.P. Cherkun, S.V. Chekalin, *Inst. of Spectroscopy, RAS, Russia.* A novel type of microscopy based on scanning in vacuum by a beam of charged particles transmitted through a hollow probe, micro-capillary, has been experimentally demonstrated. It paves the way to detect large organic molecules with high spatio-elemental resolution

IThN5
Mapping of the Local Vibrational Dynamics in Disordered Solids at Low Temperatures, T.A. Anikushina, A.V. Naumov, L. Kador, *Inst. of Spectroscopy of the Russian Academy of Sciences, Russia.* We propose and demonstrate the possibility of experimental realization of a method of mapping the local characteristics of the low-temperature vibrational dynamics by analyzing the temperature dependence of the spectra and images of single impurity molecules.

IThN6
Super-resolution Definition of Single Quantum Dots Coordinate, Maksim Eremchev, I. Yu. Eremchev, A. V. Naumov, *Inst. for Spectroscopy RAS, Moscow Inst. of Physics and Technology, Russia.* In this research a relation between the accuracy of restoration of the single quantum dots (QD) CdSe/CdS/ZnS cross-cut coordinates and luminescence intensity was investigated.

LThE • 18:30-20:00
Biophotonics and Laser Biomedicine (LAT-04): Posters

LThE1
Fluorescence meter for diagnostic purpose with reference channel, V.N. Grishanov, D.V. Kornilin, D.S. Burkov, *Samara National Research Univ., Russia.* Proposed fluorescence meter estimates skin autofluorescence made in vivo for advanced glycation endproduct evaluation. This instrument is helpful for prognosis of chronic diseases. Light emitting diode with a peak wavelength of 365 nm was utilized.

LThE2
Development of intraoperative videosystem for fluorescence diagnostics and photodynamic therapy monitoring of malignant tumors, A.V. Borodkin, K.G. Linkov, P.V. Grachev, M.V. Loshchenov, *A.M. Prokhorov General Physics Inst., RAS, Russian Federation.* The primary goal of this development is to increase the efficacy of the intraoperative visualization of malignant tumors with development of fluorescence diagnostics methods. Fluorescence diagnostics allows precise determining of tumor boundaries. Also we developed a technique for assessment of photosensitizer(PS) concentration and dosimetry and control of photodynamic therapy (PDT) efficacy. The developed system uses 635nm laser light for the fluorescence excitation to achieve deeper penetration depth.

LThE3
Biological Activity of Low-Intensity Continuous, Quasi-Continuous and Pulsed Laser Radiation of Nano- and Picosecond Ranges, V.Yu. Plavskii, N.V. Barulin, A.V. Mikulich, A.I. Vodchits, I.A. Khadasevich, L.E. Batay, A.S. Grabchikov, A.I. Tretyakova, L.G. Plavskaya, V.A. Orlovich, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* It is established that biological effect of laser radiation controlled on functional activity of zooplankton and sturgeon sperm is strongly dependent on the mode of acting radiation under conditions with equal average power density.

LThE4
The Use of Semiconductor Lasers and LEDs as Fungicidal Factor, A.V. Mikulich, A.I. Tretyakova, L.G. Plavskaya, I.A. Leusenko, V.S. Ulashchik, V.Yu. Plavskii, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The ability of polyene antibiotic amphotericin B to act as photosensitizer and to enhance its fungicidal action upon exposure to radiation (semiconductor lasers and LEDs) corresponding to absorption band of amphotericin B has been shown.

LThE5
Photostability of bilirubin and the mechanism of its photosensitizing effect on animal cells in culture, O.A. Kozlenkova, L.G. Plavskaya, O.N. Dydinova, A.V. Mikulich, I.A. Leusenko, A.I. Tretyakova, V.Yu. Plavskii, J. Gao, D. Xiong, X. Wu, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The exposure to radiation of LED sources with λem = 465 and 520 nm causes identical damaging effects on animal cells that may be due to significant change in the spectral characteristics of bilirubin upon entering into the cells.

LThE6
Time-Resolved Laser-Induced Fluorescence Spectroscopy for Identification of Pituitary Adenoma, A. N. Sobchuk, N. A. Nemkovich, Yu.V Kruchenok, Yu. G. Shanko, A. I. Chuhonsky, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* Rapid and high-sensitivity identification of pituitary adenoma can be carried out by measuring the autofluorescence decays. It is found that a significant difference is observed in the autofluorescence mean lifetime of tumorous and healthy tissues in the 380–600-nm spectral range.

LThE7
The Investigation of Tubulins Intracellular Distribution in Healthy and Cancerous Colon Tissue, S.B. Bushuk, A.S. Portyanko, Ju.A. Kalvinkovskaya, B.A. Bushuk, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The distribution of \beta I-tubulins, acetyl-tubulins and tyrosin-tubulins in microtubules of healthy and cancerous cells has been investigated by FRET-FLIM method. It has been shown that in healthy tissue unlike the cancerous one the microtubules structure contains colocalized tubulins.

LThE8
Depth independent Cerenkov radiation mediated therapy with 5-ALA photosensitizer, Yu.S. Maklygina, A.V. Ryabova, V.B. Loschenov, E.N. Sokolov, D.I. Nevzorov, E.Yu. Grigoreva, M.B. Dolgushin, B.I. Dolgushin, *A.M. Prokhorov General Physics Inst., RAS, Russian Federation.* The main goal of the research is the photosensitizer activation using Cerenkov radiation from radionuclides. Histological analysis of tumor sections showed possibility to achieve depth independent Cerenkov radiation mediated therapy using different types of photosensitizers.

LThE9
Spectroscopic diagnostics of laser-induced change of structure of ascorbic acid solution, Y.S. Danyaeva, S.A. Kutsenko, *Volgograd State Univ., Russia.* The results of research of effect of powerful laser radiation on the structure of the electronic spectra of ascorbic acid are presented. Changes in the molecule's structures are defined by comparing the results of experiments and quantum chemical calculations.

LThE10
Laser Systems and Fiber Optic Tools for Photodynamic Therapy, K.G. Linkov, V.V. Volkov, *A.M. Prokhorov General Physics Inst., RAS, Russian Federation.* New therapeutic laser systems and fiber-optic light delivery tools were designed for further development of fluorescence diagnosis and photodynamic therapy. Features and advantages of developed laser equipment and possible applications of fiber-optic instruments are considered.

LThE11
Singlet Oxygen Generation by Zeolite-Porphyrin Complexes, M.V. Parkhats, S.V. Lepeshkevich, A.S. Stasheuski, B.M. Dzhagarov, H.H. Sargsyan, R.K. Ghazaryan, A.G. Gyulkhandanyan, G.V. Gyulkhandanyan, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The investigated zeolite-porphyrin complexes generate singlet oxygen with low quantum yields and can not be used as photosensitizes for photodynamic therapy

LThE12
Molecular Oxygen Migration Through the Xenon Docking Sites of Human Hemoglobin and Its Isolated Chains, S.V. Lepeshkevich, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* In the alpha subunits of human hemoglobin, in addition to the direct His(E7) channel, there is at least one alternative ligand escape route leading to the exterior via the xenon docking sites.

LThE13
Highly Stable and Widely Tunable Ultrashort Pulse Distributed Feedback Dye Laser for Biomedical Applications, T.Sh. Efendiev, V.M. Katarkevich, Yu.V. Kruchenok, V.Yu. Plavskii, A.N. Sobchuk, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* Highly stable and widely tunable ultrashort pulse distributed feedback dye laser excited by a diode-pumped solid-state Nd:YLF micro laser is reported. The realized laser source is especially suitable for the time-resolved spectroscopic studies of biomedical objects.

LThE14
The nanostructure formation via laser ablation of porous silicon for biomedical applications, F.V. Kashaev, T.P. Kaminskaya, S.V. Zabotnov, D.A. Loginova, P.D. Agrba, M.Yu. Kirillin, L.A. Golovan, *Lomonosov Moscow State Univ., Russia.* The investigation of structural and optical properties of the nanoparticles formed via laser ablation of porous silicon in helium and water, confirms a possibility of their application in optical coherence tomography and photodynamic therapy.

LThE15
Laser Scanning Microscope Usage for Investigation of the Dynamics of a Chemical Agent Penetration into the Skin, T.A. Zheleznyakova, A.A. Ryzhevich, S.V. Solonevich, S.B. Bushuk, *B.I.Stepanov Inst. of Physics of NASB, State Univ., Belarus.* We investigated the preparation concentration dependence on the depth by luminescence microscopy after locating preparation on skin. We found out a temporary depot of the preparation between the horny layer and the underlying epidermis layer.

LThE16
Laser impact monitoring during photocoagulation using optoacoustic technique, A. Lytkin, A. Larichev, S. Shmeleva, V. Simonova, V. Sipliviy, A. Bolshunov, A. Ardamakova, *Lomonosov Moscow State Univ., Russian Federation.* Method aimed at temperature control during lasercoagulation is based on optoacoustic technique that includes experimental determination of laser absorption coefficient and following numerical calculations. Values for different series of chorioretinal samples ex vivo were obtained in range from 1300 to 12000 1/m. Three-dimentional model of chorioretinal thermal heating is developed.

LThE17
Ablation treatment of dental tissue by 1060 nm radiation, S. Anufrick, A. Volodenkov, K. Znosko, *Grodno State Univ., Belarus.* The treatment of dental tissue is executed by 1060 nm radiation and dependence of value of specific energy of evaporation from density of peak power of laser radiation is determined. It is established, that threshold of ablation of dental enamel is 12 J/cm2 and it is found that at density of energy more then 3 J/cm2 the efficient removal of dental calcium takes place without ablation of dental enamel.

LThE18
Ablation treatment of dental tissue by 530 nm radiation, S. Anufrick, A. Volodenkov, K. Znosko, *Grodno State Univ., Belarus.* The treatment of dental enamel is executed by 530 nm radiation and dependence of value of specific energy of evaporation from density of peak power of laser radiation is determined. It is established, that threshold of ablation of dental enamel is 4,1 J/cm2 and it is found that at density of energy more then 1 J/cm2 the efficient removal of dental calcium takes place without ablation of dental enamel.

LThE19
The influence of various factors on the interaction mechanism of collagen and collagenase molecules in water solutions by dynamic light scattering, A.R. Krot, I.A. Sergeeva, K.A. Anenkova, A.D. Maslennikova, A.V. Shlenskaya, G.P. Petrova, *Lomonosov Moscow State Univ., Russia.* Enzyme based drugs are commonly used in medicine. Bacterial collagenase (for example from Clostridium histolyticum) is one of them. Collagenase main feature is its ability to break the peptide bonds in collagen. Optical methods, like dynamic light scattering (DLS), enable to investigate "collagen + collagenase" water solutions in conditions close to physiological. Variating the solution's parameters (pH, temperature, solvent type) and adding of collagenase activa-

tors/inhibitors enables to simulate different diseases in living organizms.

LThE20
Reconnectable fiberscopes for long-term, subcellular-resolution in vivo deep-brain imaging, M.S. Pochechuev, I.V. Fedotov, O.I. Ivashkina, M.A. Roshchina, A.B. Fedotov, K.V. Anokhin, and A.M. Zheltikov, *Kurchatov Inst., Russia.* Reconnectable bundles consisting of thousands of optical fibers are shown to enable high-quality image transmission, offering a platform for the creation of implantable fiberscopes for minimally invasive, long-term in vivo brain imaging with subcellular resolution.

LThE21
Detection of flavin fluorescence in lung adenocarcinoma cells by FLIM, E. A. Boruleva, V.V. Zherdeva, A. P. Savitsky, *National Research Nuclear Univ. "MEPhI" Bach Inst. of Biochemistry, Research Center of Biotechnology of RAS, Russia.* The work evaluated the conditions of endogenous fluorescence detection in tumor cells by the FLIM method for determining the flavin fluorescence.

LThE22
Femtosecond laser surgery of mammalian embryo and oocytes., A.A. Osychenko, A.A. Astafiev, A.M. Shakhov, A.D. Zalessky, A.A. Titov, V.A. Nadtochenko, *Semenov Inst. of Chemical Physics, RAS, Russia.* The work reports the study of the size and dynamics cavitation bubbles produced by focused femtosecond laser pulse when laser irradiation is focused at different components (organelles) in the mammalian oocyte.

LThE23
UV vanadate lasers for medicine applications, A.A. Sirotkin, G.P. Kuzmin, *A.M. Prokhorov General Physics Inst., RAS, Russia.* We have demonstrated a low-cost, compact, high-efficiency passively Q-switched UV-VIS-IR laser for medicine systems based on the variable-cut Nd:GdVO4 laser with Cr4+:YAG saturable absorber crystal. The average power of visible and UV radiation up to 310 and 7 mW has been obtained in crystals PPLN and BBO, respectively.

LThE24
Clinical application of the multiwavelength laser medical installation with antibacterial and therapeutic effect., A.G. Kuzmina, K.K. Baranov, N.E. Gorbatova, V.P. Kurilov, G.P. Kuzmin, A.A. Sirotkin, O.V. Tikhonevich, S.A. Zolotov, *A.M. Prokhorov General Physics Inst., RAS, Russia.* Multiwavelength laser medical device "Livadia" is created on the basis of the laser on YVO4-Nd: YVO4 with subsequent conversion of the infrared radiation in the visible and ultraviolet regions of the spectrum. The radiation device is used with antibacterial and anti-inflammatory target for treatment a range of infectious and inflammatory diseases of external and intracavitary sites.

LThE25
Electrostatic interaction in biopolimer water solutions investigated by Laser light scattering., Yu.D. Stroganova K.V. Fedorova, G.P. Petrova, *Lomonosov Moscow State Univ., Russia.* In this paper we consider electrostatic interaction of lysozyme molecules in aqueous solution in the presence of the third component - the metallic ions. This paper deals with the most suitable methods for measurement of these parameters - laser light scattering.

LThE26
Multicomponent diode laser gas analyzer for medical screening diagnostics: Qualitative and quantitative feature of biomarkers of human exhaled air at different functional states, A. Karabinenko, A. Bogomolova, S. Shastun, A. Nadezhdenskii, Ya. Ponurovskii, M. Spiridonov, V. Zaslavskii, *Pirogov Russian National Research Medical Univ. (RNRMU), A.M. Prokhorov General Physics Inst., RAS, Russian Federation.* Screening tests are effective methods of assessing the functional state of the organism. The screening study in medicine is understood as a set of measures aimed at identifying the diseases in a large group of patients in the absence of pronounced symptoms. The main requirements for a screening test is its simplicity, noninvasiveness, and safety of the testing procedures, as well as high processing speed and the ability to detect diseases at an early stage. An experimental prototype of multi-channel analyzer for non-invasive screening and biomedical research was developed on the basis of fiber coupled the near-IR range diode lasers. Device enables to measure 12CO2, 13CO2, CH4, NH3 and H2S biomarkers of the exhaled air. Detection of CH4 was carried out in the wavelength range of 1.65 μm, ammonium NH3 in the 1.51 μm and the 12CO2, 13CO2 and H2S in the range 1.60 μm. Measuring the concentrations of the five molecules simultaneously were carried out in Herriot type multipass cell with full optical path length of 26 m and a volume of 2.5 liters. All measurements were made in real time. Fig. 1 presents photo multi-channel diode laser analyzer for non-invasive screening and biomedical research. Clinical tests of the diode laser spectrometer were performed in the Moscow City Clinical Hospital No 12. The measurements were performed in 162 patients with various diseases in phase and remission at rest, during exercise, recovery and after meals. Identified biomarkers of exhaled air, allowing to assess the state of the cardiorespiratory function, gaseous Ingredients, reflecting the intensity of the digestive system and the degree of infestation B. Helicobacter pylori, the nature of the food regime. Identified deviations biomarkers of exhaled air levels have diagnostic and prognostic value during mass screening.

LThE27
Developing algorithms and software for fluorescence imaging of intracavitary organs, A. A. Anam, M. V. Loshchenov, *National Research Nuclear Univ. "MEPhI", Russian Federation.* The programm developed for fluorescence imaging of biotissue will be present in this work.

LThE28
The Spectral Fluorescence Method of the Bacteriochlorin Accumulation Dynamic Estimation in the Mice Skin with Superficial Wound Staphylococcus Infection, E.V. Akhlyustina, Yu.S. Maklygina, A.V. Borodkin, A.V. Ryabova, A.A. Kuneva, P.A. Rybakova, D.V. Yakovlev, G.A. Meerovich, E.V. Filonenko, *National Research Nuclear Univ. "MEPhI", Russia.* Derivatives of bacteriochlorins are promising for use for photodynamic therapy The research results showed that the developed fluorescent spectroscopic approaches are promising in order to study pharmacokinetics and biodistribution on mice of superficial wound Staphylococcus infection.

LThE29
Joint Application of Fluorescence Imaging and Local Fluorescence Spectroscopy for PD and PDT of Skin Cancer, A.E. Mukhin, A.V. Borodkin, P.V. Grachev, E.F. Stranadko, *National Research Nuclear Univ. "MEPhI", Russia.* In this paper the results of PD of the patient with skin cancer of the ear is discussed. By “LESA-01-Biospec” and by fluorescent video system were held fluorescent spectra analysis and fluorescence imaging of the general dynamics of photosensitizer accumulation after 3 hours after drug injection before, during and after PDT.

LThF • 18:30-20:00
Nanomaterials for Lasers (LAT-05): Posters

LThF1
Photoluminescence of CdSe nanoplatelets through surface states, A.O. Muravitskaya, L.I. Gurinovich, A.V. Prudnikau, M.V. Artemyev, S.V. Gaponenko, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The photoluminescence (PL) of colloidal CdSe nanoplatelets in external electric field has been studied experimentally. It was shown, that the low-energy PL band consists of two peaks of the Gaussian form with various amplitude and half-width, which can correspond to radiative recombination on defects of a crystal lattice or on surface traps.

LThF2
Optical properties of laser-deposited zinc oxide films doped with holmium fluoride, A.N. Chumakov, A. V. Gulay, A. A. Shevchenok, L. V. Baran, T. F. Raichyonok, A. G. Karoza, A. S. Matsukovich, N.A. Bosak, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* Holmium fluoride-doped zinc oxide films were deposited on a silicon substrate by multi-pulse high-frequency (5-50 kHz) laser evaporation of a ceramic target. The structure of the films was investigated with an atomic force microscope, and their spectra of photoluminescence, absorption, and Raman scattering were examined. It is shown that the doping of zinc oxide with holmium fluoride causes a significant increase in spectral transmittance of the films in a 1–10 μm range.

LThF3
Nonlinear Properties Of Photopolymer Nanocomposites Based On The Laser Ablation In Liquid Monomer Synthesized AgNPs And AuNPs, I.M. Pavlovetc, N.A. Zulina, I.Yu. Denisyuk, *ITMO Univ., Russia.* AgNPs and AuNPs stable colloids were synthesized by laser ablation in liquid monomer. Solid film nanocomposites based on these colloids are prepared by photocuring and their optical and nonlinear optical properties are investigated

LThF4
Laser Assisted Synthesis of Composite Nanostructures in Liquid, V.S. Burakov, A.V. Butsen, N.N. Tarasenka, N.V. Tarasenko, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* Several approaches of pulsed laser ablation in liquids, such as the sequential ablation of targets in the same solution, ablation of combined targets, as well as post irradiation are discussed for preparing composites nanoparticles.

LThF5
Phase retardation properties of the porous nanocomposite alumina films, V. Dlugunovich, A. Zhumar, N. Mukhurov, *B.I.Stepanov Inst. of Physics of NASB, Belarus.* The methodology of Stokes-polarimetry and coherence matrix has been suggested for determination of the phase shift between the orthogonally polarized components of light transmitted by a nanoporous alumina film taking into account diattenuation of the films and depolarization of the transmitted radiation.

Hall 1 ICONO-09/3	Hall 2 ICONO-03/6	Notes

09:00-11:00
IFA ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution III (ICONO-09/3)
Christian von Borczyskowski*, Technische Univ. Chemnitz, Germany, Chair*

IFA1 • 09:00-09:30 • INVITED
Luminescence blinking - from single molecules to micrometer-sized perovskite crystals, A. Merdasa, Y. Tian, A. Dobrovolsky, I.G. Scheblykin, *Chemical Physics, Lund Univ., Sweden.* Luminescence blinking of micro-crystals of organometal halide perovskite semiconductors is discussed in relation to charge carrier migration and trapping. Super-resolution optical imaging combined with luminescence spectroscopy is applied to understand photophysics of these inhomogeneous semiconductors

IFA2 • 09:30-10:00 • INVITED
Optical near-field dichroism controlled with a plasmonic nanoantenna, S.S. Kharintsev, A.I. Fishman, S.K. Saikin and S.G. Kazarian, *Kazan Federal Univ., Inst. of Physics, Russia.* In this paper, we demonstrate a near-field Raman dichroism, driven with a biased gold tip, of azobenzene-functionalized amorphous polymeric thin films by means of polarization-controlled tip-enhanced Raman scattering

09:00-11:00
IFB ● Nanophotonics and Plasmonics VI (ICONO-03/6)
Tao Li*, Nanjing Univ., China, Chair*

IFB1 • 09:00-09:30 • INVITED
Laser-induced nanocluster and fractal structures with topological quantum effects, S.M. Arakelian, S.V. Kutrovskaya, A.V. Osipov, A.O. Kucherik, T.A. Vartanyan, S.P. Zimin, *Stoletovs Vladimir State Univ., Russia.* Two classes of the study fields are under our consideration: (1) laser-induced surface and thin films nanostructures with controlled topology (background and principal items); (2) the quantum states verification in cluster structures.

IFB2 • 09:30-09:45 • ORAL
Laser synthesis of single-crystal carbon microstructures, K.S. Khorkov, D.V. Abramov, D.A. Kochuev, R.V. Chkalov, S.M. Arakelian, V.G. Prokoshev, *Stoletovs Vladimir State Univ., Russia.* Proposed pilot experiments on the effects of femtosecond laser radiation on the carbon samples in liquid nitrogen. A variety of single-crystal carbon structures are obtained.

Hall 1 ICONO-09/3	Hall 2 ICONO-03/6	Notes
09:00-11:00 IFA ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution III (ICONO-09/3)—Continued	09:00-11:00 IFB ● Nanophotonics and Plasmonics VI (ICONO-03/6)—Continued	
	IFB3 • 09:45-10:00 • ORAL *Laser synthesys of a metal-carbyne clusters for SERS,* A. Kucherik, A. Antipov, S. Arakelian, S. Kutrovskaya, A. Osipov, T. Vartanyan, A. Povolotckaia, A. Povolotskiy, A. Manshina, *Stoletov Vladimir State Univ., Russia.* In this work a method for the laser formation of C-Au-Ag clusters for SERS on the surface of an optically transparent media is discussed	
IFA3 • 10:00-10:30 • INVITED *Diamonds for quantum nanosensing: A critical review of recent developments,* T. Plakhotnik, *The Univ. of Queensland, Australia.* In this talk I will discus the most recent developments in the field of nanosensing. The main focus is on the limits set by nature for the sensitivity and accuracy of color centers in diamond.	IFB4 • 10:00-10:30 • INVITED *Materials with magnetic hyperbolic dispersion,* S. Kruk, Z.J. Wong, E. Pshenay-Severin, K. O'Brien, D. Neshev, Y. Kivshar, X. Zhang, *Australian National Univ., Australia.* We present the experimental demonstration of the magnetic hyperbolic dispersion in three-dimensional metamaterials. In the hyperbolic regime, we demonstrate the strong enhancement of thermal emission, which becomes directional, coherent and polarized.	

Hall 1 ICONO-09/3	Hall 2 ICONO-03/6	Notes

09:00-11:00
IFA ● Spectroscopy and Nanoscopy down to Single Molecules and Atomic Resolution III (ICONO-09/3)—Continued

IFA4 • 10:30-10:45 • ORAL
Laser fine structural spectroscopy of tetrapyrrole molecules and their dimers: From site-selection to single molecule detection, A. Starukhin, E. Zenkevich, *Stepanov Inst. of physics NASB, Belarus.* It is demonstrated that FLN, SHB and SMS spectroscopic methods applied to porphyrins and their dimers at 1.8 - 4.2 K, give the possibility to analyze separately inhomogeneous broadening effects, excitonic interactions and energy transfer events.

IFA5 • 10:45-11:00 • ORAL
Raman confocal microscopy with the highest spatial resolution, V. Kopachevsky, S. Shashkov, A. Gvozdev, A. Grigorenko, A. Andriyash, *SOL instruments Ltd., Belarus.* Conventional micro-Raman spectroscopy has a spatial resolution which is governed by the diffraction limit. In this work, several approaches have been tested and discussed to improve the spatial resolution below diffraction limit.

09:00-11:00
IFB ● Nanophotonics and Plasmonics VI (ICONO-03/6)—Continued

IFB5 • 10:30-10:45 • ORAL
Super-Planck thermal emission in a cavity with hyperbolic medium, L.A. Melnikov, O.N. Kozina, I.S. Nefedov, *Kotel'nikov Inst. of Radio-Engineering and Electronics, RAS, Russia.* Electromagnetic radiation in the cavity with anisotropic hyperbolic metamaterial are investigated using direct calculation of modal field and dispersion equation. Providing thermal distribution of mode quanta the super-Planck emission in far zone is confirmed.

IFB6 • 10:45-11:00 • ORAL
Influence of spherical particles and their dimers on the linewidth of forbidden E2 transitions, D.V. Guzatov, *Yanka Kupala State Univ. of Grodno, Belarus.* Influence of spherical particles and their dimers on the radiative linewidth of forbidden E2 transitions of an atom is discussed. It is shown that metallic nanoparticles and their dimers can increase E2 transitions linewidth.

Hall 1	Hall 2 ICONO-03/7	Notes

11:30-13:00
IFC • Nanophotonics and Plasmonics VII (ICONO-03/7)
Sergei Arakelian*, Stoletov Vladimie State Univ., Russia, Chair*

IFC1 • 11:30-12:00 • INVITED
Plasmonic interference for classical and quantum logical gates, T. Li*, S. M. Wang, Y. L. Wang, S. N. Zhu, *Nanjing Univ., P.R. China.* Plasmonic has provided versatile solutions to confine the light at sub-wavelength scale together with strong field enhancement, which enables great possibilities for compact photonic integration and other applications. In this talk, I would firstly show an interesting composite plasmonic interference resulted from two crossed strip-metallic waveguides with a narrower gap, where the vectorial field configuration gives rise to two quite different interferences (synchronous and antisynchronous). These plasmonic switches under different phase conditions are found to work as photonic logical gates for some specific functionality [1]. Secondly, in a further step, classical plasmonic interference is extended to quantum regime. Here, I would like to report the first realization of a plasmonic Control-NOT gate for two polarization-entangled plasmonic qubits based on the metal/dielectric hybrid waveguide, which is the very fundamental block for integrated quantum processing. This device is implemented by a polarization sensitive beam splitter that is formed by a proper grating in the hybrid waveguide. It enables an R/T ratio of 2/1 for the TM wave (SPP) while direct transmission for TE wave, which satisfies the requirement of the CNOT gate. Finally, we realize, to our knowledge, the smallest CNOT gate (14 63.7%<F<80.3% [2]. This result demonstrates the validation of plasmonic system to quantum information science and technology.

IFC2 • 12:00-12:15 • ORAL
Fluorescent visualization of arbitrarily oriented single quantum emitters in planar microcavities, S.V. Boichenko, *Irkutsk Branch of Inst. of Laser Physics, SB RAS, Russia.* We theoretically study the problem of visualization of arbitrarily oriented single quantum dipole emitters located in planar Fabri–Perot microcavities by means of high NA laser-scanning confocal fluorescence microscopy based on elliptically polarized cylindrical vector beam excitation.

Hall 1	Hall 2 ICONO-03/7	Notes

11:30-13:00
IFC ● Nanophotonics and Plasmonics VII
(ICONO-03/7)—Continued

IFC3 • 12:15-12:30 • ORAL
Physical picture of near-field interaction: CdSe/ZnS nanoparticles on the surface of plasmonic film, V. F. Askirka, I.G. Motevich, I.F. Sveklo, S.A. Maskevich, and N.D. Strekal, *Yanka Kupala Grodno State Univ., Belarus.* Enhancement of CdSe/ZnS nanoparticles fluorescence emission positioned in direct contact to plasmonic gold film is detected in far field as exclusive case of exchange of so called dressed photon in near-field between semiconductor and gold nanoparticles.

IFC4 • 12:30-12:45 • ORAL
Near-field polarization distribution of subwavelength Si nanoparticles near quartz and graphite substrates, Yu.V. Vladimirova, S.A. Reshetov, V.N. Zadkov, *International Laser Center & Faculty of Physics, Lomonosov Moscow State Univ., Russia.* Structure of the near field (intensity and polarization distribution, the latter is described with the generalized three-dimensional Stokes parameters) of a spherical Si subwavelength nanoparticle in the non-magnetic and non-absorbing media near a dielectric substrate has been studied in detail with the help of Mie theory and an extension of Weyl's method for the calculation of the reflection of dipole radiation by a flat surface. It is shown that for the nanoparticle near the substrate the interference effects due to the scattering by the nanoparticle and interaction with the substrate play an essential role. We also demonstrate how these effects depend on the dielectric properties of the nanoparticle, its size, distance to the substrate and polarization, wavelength and angle of the incident light field.

IFC5 • 12:45-13:00 • ORAL
Interferometry of the subwavelength metamaterial layers, A. Agashkov, *The Inst. of Physics of NAS Belarus, Belarus.* For the first time, negative optical thickness of the subwavelength metamaterial layer has been established using optical interferometry. It is shown that positive optical thickness can be compensated in air by a distant metamaterial layer

KEY TO AUTHORS/PRESIDERS