

CONFERENCE PROGRAM

ICQOQI'2019

Sunday, May 12 (Hotel Belarus)

16:00 – 20:00 Registration (Hotel Belarus, Entrance hall)

Monday, May 13 (Hotel Belarus – registration & NASB - sessions)

9:00 – 12:00 Registration (Hotel Belarus, Entrance hall)

12:00 – 13:00 Lunch

13:10 – Transfer to Presidium of NASB

14:00 – 16:30 Mo13C: Plenary session (Chairman: *S. Kilin*)

Conference opening

B. Englert “Evidence in Quantum Data”

H. Wiseman “The Heisenberg Limit for Laser Coherence”

A. Lvovsky “Schrödinger cats in quantum optics”

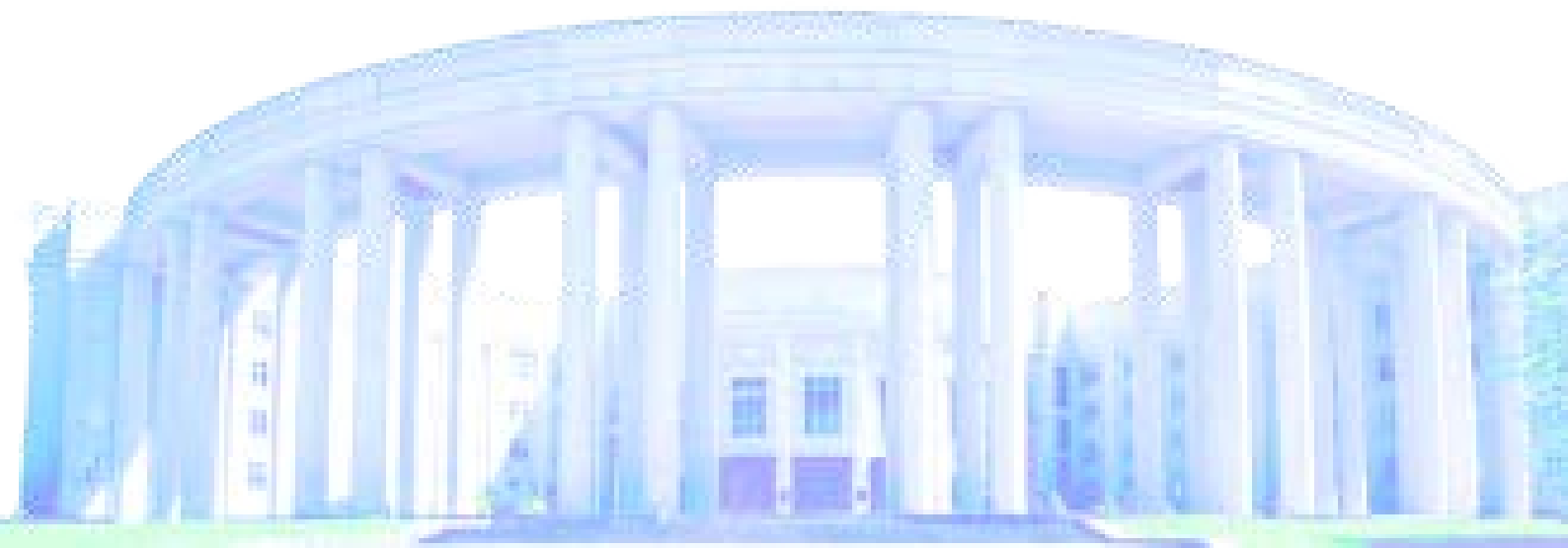
16:30 – 17:00 Coffee break

17:00 – 18:30 Mo13D: Plenary session (Chairman: *B. Englert*)

A. Kuzmich “Atom-field dynamics and coherence with strongly interacting, trapped atomic ensembles”

A. Zheltikov “Fiber-optic quantum biothermometry: physics, materials, design, and in vivo experiments”

19:00 – 21:00 WELCOME PARTY



Tuesday, May 14 (Hotel Belarus)

9:00 – 11:00 Tu14A: Morning parallel session

Tu14A(A): Cold atomic ensembles (Chairman: *G. Toth*)

S. Kuhr “Single-atom imaging in a fermionic quantum-gas microscope”

F. Plastina “Decoherence in a synthetic fermion environment: from orthogonality catastrophe to Fano physics”

A. Akimov “Feshbach resonances in Thulium atom”

Ig. Sokolov “Influence of static electric field on radiative transfer in cold atomic ensembles”

Tu14A(B): Time-domain quantum optics (Chairman: *D. Horoshko*)

A. Leitenstorfer “Status of Time-domain Electro-optic Sampling of Mid-infrared Quantum Fields”

A. Moskalenko “Time-domain Approach to Ultrafast Quantum Optics”

B. Brecht “Tailored generation, manipulation, and application of photonic temporal modes”

M. Karpinski “Spectral shaping of quantum light using complex temporal optical systems”

Tu14A(C): Quantum entanglement (Chairman: *T. Barthel*)

A. Smerzi “Multipartite entanglement in quantum technologies and quantum phase transitions”

L. Mista “Verifying genuine multipartite entanglement of the whole from its separable parts”

V. Shatokhin “Adaptive Optics Compensation for Turbulence-Induced Entanglement Decay of High-Dimensional States”

11:00 – 11:30 Coffee break

11:30 – 13:00 Tu14B: Plenary session (Chairman: *A. Lvovsky*)

K. Banaszek “From Quantum Information Science to Deep-Space Optical Communication”

G. Toth “Entanglement between two spatially separated atomic modes”

13:00 – 14:00 Lunch

14:00 – 16:00 Tu14C: Afternoon parallel session

Tu14C(A): Metamaterials and nanophotonics (Chairman: *A. Akimov*)

U. Woggon “Strong, highly directional and size-tunable two-photon absorption (TPA) in colloidal CdSe nanoplatelets”

V. Temnov “Physics of magnetic meta-surfaces”

I. Bondarev “Transdimensional Quantum Optics with Plasmonic Films of Controlled Thickness”

V. Klimov “Localized Energy Sources and Sinks in Optics and Electronics of Metamaterials”

Tu14C(B): Nonclassicality and coherence of quantum states (Chairman: *H. Wiseman*)

R. Filip “Quantum Non-Gaussian Light and Matter”

S. De Bievre “Measuring the Non-Classicality of the Quantum States of a Bosonic Field with Ordering Sensitivity”

A. Isar “Evolution of Quantum Coherence in a Two-Mode Gaussian Open Quantum System”

T. Barthel “Crossover of eigenstate entanglement from groundstate to extensive scaling”

Tu14C(C): Light-matter interaction (Chairman: *S. Gleyzes*)

C. Genes “Cavity QED with Molecules”

V. Yudson “Long-Lasted Luminescence of an Inhomogeneously Broadened Dicke Ensemble”

M. Gladush “A Quantum Statistical Formalism to Compute Collective Photoluminescence and Photoluminescence Excitation Spectra for Emitters in an Environment”

I. Feranchuk “Statistical Characteristics of the Quantum Rabi Model beyond the Rotating Wave Approximation”

16:00 – 16:30 Coffee break

16:30 – 18:00 Tu14D: Evening parallel session

**Tu14D(A): Trapped atoms I (Chairman:
A. Kuzmich)**

V. Balykin “Atom trapping by femtosecond laser radiation”

R. Spreuw Strontium atoms in optical tweezer arrays”

D. Matsukevich “Continuous variable quantum computations with trapped ions”

**Tu14D(B): Color centers: light emission (Chairman:
A. Nizovtsev)**

A. Huck “Coupling a Single GeV Center in Diamond to a Micro-Cavity”

A. Alkauskas “Theory of optically active defects in hexagonal boron nitride: single-photon emitters and luminescence quenchers”

S. Ditalia Tchernij “Single Photon Sources Based on Diamond Color Centers”

18:00 – 20:00 POSTER SESSION (Hall C)

See the list of poster presentations below.

Wednesday, May 15 (Hotel Belarus)

9:00 – 11:00 We15A: Morning parallel session

**We15A(A): Quantum networks (Chairman:
N. Korolkova)**

Z. Ficek “Highly directional emission and photon correlations from dissipative few-atom chains of emitters”

V. Gritsev “Non-adiabatic effects in periodically driven-dissipative open quantum systems”

J. Piilo “Full Control of Dephasing Dynamics — Complex Quantum Networks”

D. Porras “Topological Amplification in Photonic Lattices”

**We15A(B): Quantum optics for general relativity (Chairman:
W. Bowen)**

Q. Glorieux “Quantum simulation with light: from superfluidity to rotating black holes”

P.P. Crepin “Quantum interference test of the equivalence principle on antihydrogen”

F. Piacentini “Entangled Particles Near Open Time-like Curves: a Quantum Optical Simulation”

Y.S. Kim “Role of Quantum Optics in Synthesizing Quantum Mechanics and Special Relativity”

**We15A(C): Quantum state tomography (Chairman:
D. Mogilevtsev)**

Y.S. Teo “Adaptive compressive tomography without a priori information: recent results”

A. Semenov “Geometrical approach to Born's rule: An application to array detectors”

P. Kolenderski “Optimal detection scheme for quantum communication protocols and photon-matter interaction”

A. Fedorov “Machine learning for exploring quantum many-body phenomena”

L. Motka “Quantum tomography can be improved by discarding perfect knowledge of the measurement apparatus”

11:00 – 11:30 Coffee break

11:30 – 13:00 We15B: Plenary session (Chairman: **S. De Bievre**)

N. Korolkova “Coherent Diffusive Photonic: quantum engineering by loss”

S. Kulik “Progress Towards Quantum Computation Based On Photonic Chips And Trapped Neutral Atoms”

13:00 – 14:00 Lunch

14:00 – 16:30 We15C: Afternoon session

We15C(A): Quantum optomechanics (Chairman: *R. Spreuw*)

W. Bowen “Coherent vortex dynamics in a strongly interacting two-dimensional superfluid”

C. Gonzalez Ballester “New regimes of light-matter interaction in levitated nanoparticles”

B. Stickler “Levitated optomechanics with rotating nanoparticles”

T. Capelle “Towards the generation of nonclassical phononic states using quantum electromechanics”

A. Rakhubovsky “Nonclassicality and Higher-Order Nonlinearity in Levitated Optomechanics”

We15C(B): Quantum metrology (Chairman: *Z. Hradil*)

L. Maccone “Squeezing metrology”

L. Cywinski “Environmental noise spectroscopy with multiple qubits”

S. De “Multi-Parameter Noise Estimation in Optical Frequency Combs with Quantum-Limited Sensitivity”

J. Suzuki “Phase Estimation Problem in the Presence of Nuisance Parameters”

S. Slussarenko “Ab-initio Phase Estimation of an Optical Phase at the Exact Heisenberg Limit”

M. Jonsson “Analyzing the Efficiency of Photon-Number-Resolving Detectors”

We15C(C): Laser and waveguide optics (Chairman: *V. Klimov*)

K.M. Weitzel “Application of Femtosecond Laser Ionization in Material Science”

A. Foster “Quantum Non-Linear Optics with a Quantum Dot in a Nano-Photonic Waveguide”

W. Zhang “Random fiber lasers and applications”

A. Mandilara “Classical and quantum dispersion-free coherent propagation by tailoring multimodal coupling”

C. Ding “Generation, Propagation and Control of Partially Coherent Pulse Lasers”

17:00 – 18:00 Dinner

19:00 – 22:00 THEATRE VISIT (BALLET)

Thursday, May 16 (Hotel Belarus)

9:00 – 11:10 Th16A: Morning parallel session

Th16A(A): Nanostructures (Chairman: *V. Temnov*)

A. Naumov “Local fields mapping and microrefractometry by fluorescence nanoscopy of single molecules and quantum dots”

Yu. Vainer “Optical Microscopy and Spectroscopy of Single Nanoparticles”

I. Osad'ko “FRET in Single Donor-Acceptor Pair Attached to a Macromolecule Can Serve As a Tool for Studying Conformational Dynamics of the Macromolecule”

S. Shashkov “Confocal Raman microspectrometers from SOL instruments for quantum dot analysis”

Th16A(B): Fundamentals of quantum measurements (Chairman: *L. Mista*)

T. Barthel “Fundamental limitations for measurements in quantum many-body systems”

S. Mancini “Union bound for quantum information processing”

K. Szymanski “Tight Uncertainty Relations for Angular Momentum Operators”

A. Lovas “Quantum copulas”

V. Stefanov “Gravitational decoherence for timed Dicke state”

Th16A(C): Cluster states. Quantum algorithms (Chairman: *D. Matsukevich*)

T. Golubeva “Universal quantum computations on the ensemble of two-node clusters in continuous variables”

L. Caspani “High-Dimensional Cluster State on Chip and Optimal Entanglement Witnesses for One-Way Quantum Computing”

K. Tikhonov “Cluster State Generation and Fault-tolerant Logic Gates on the Basis of Quantum Memory Cells”

E. Vashukevich “Squeezed eigenmodes of the OPO and cluster states based on modes with orbital angular momentum”

11:10 – 11:30 Coffee break

11:30 – 13:00 Th16B: Plenary session (Chairman: *S. Mancini*)

F. Jelezko “High sensitivity NMR enabled by diamond colour centers”

Z. Hradil “Optical Resolution at the Quantum Fisher Information Limit”

13:00 – 14:00 Lunch

14:00 – 16:00 Th16C: Afternoon parallel session

Th16C(A): Entangled and single-photon light (Chairman: *E. Brambilla*)

R. Morandotti “Complex entangled photon states based on a microfrequency comb”

A. Forbes “High-dimensional entanglement with spatial modes of light”

S. Fukatsu “Single-photon source pumped by light-emitting diode”

D. Horoshko “Squeezing eigenmodes of twin beams of light”

F. Ripka “Proof of Concept of an On-Demand Single-Photon Emitter Based on Rydberg Interactions in a Thermal Vapor Cell”

Th16C(B): Color centers: sensing (Chairman: *M. Nesladek*)

J. Ishi-Hayase “Highly-sensitive AC Magnetic Field Sensing based on Electric Spin Manipulation of Nitrogen-vacancy Centers in Diamond”

L. Mayer “Nitrogen-vacancy centres in diamond for instantaneous spectral analysis in the radiofrequency domain up to 18 GHz”

I. Brev “Physical Foundations of Submicron Quantum Probing of Magnetic Fields and Temperatures with Application of Spin Centers in SiC”

M. Gieysztor “Analysis of the NV centers’ fluorescence dynamics on a single photon level”

D. Kwiatkowski “Sensing the environment using two NV centers”

Th16C(C): Quantum imaging and microscopy (Chairman: *L. Maccone*)

A. Stefanov “Quantum Imaging with Single Photon Detector Arrays”

R. Lapkiewicz “Super-Resolution Enhancement by Quantum Image Scanning Microscopy”

S. Sekatskii “Fluorescence Resonance Energy Transfer Scanning Near-Field Optical Microscopy: What Microscope Is Needed and What Fluorescence Centers Are Photostable Enough to Be Used at Single Molecule Level”

A. Mikhalychev “Fisher information: a practical tool for optimizing quantum imaging”

A. Tarasevich “Fluorescence Nanoscopy of Single Quantum Dot Pairs”

16:00 – 16:30 Coffee break

16:30 – 18:00 Th16D: Evening parallel session

Th16D(A): Trapped atoms II (Chairman: *I. Ryabtsev*)

K. Rzazewski “A few dipolar bosons in a ring trap”

D. Kupriyanov “On a theory of Raman sideband cooling of single atom in an optical dipole trap”

C. Sayrin “Towards Quantum Simulation with Circular Rydberg Atoms”

Th16D(B): NV centers for quantum information processing (Chairman: *F. Jelezko*)

M. Nesladek “Photoelectrically read electrically interfaceable single diamonds qubits”

G. Morley “Levitating nanodiamonds towards testing fundamental physics”

M. Trupke “Quantum Technology with Spin Centres in Semiconductors”

Th16D(C): Coherent effects and entanglement (Chairman: *V. Yudson*)

N. Cerf “Hong-Ou-Mandel effect under partial time reversal: an interference effect due to timelike indistinguishability in the amplification of light”

S. Gleyzes “Quantum Rabi oscillation in a mesoscopic field”

D. Cavalcanti “Efficient device-independent certification of multipartite entanglement in quantum networks”

18:00 – 18:45 Th16E: Evening plenary session (Chairman: *S. Kilin*)

L. Sanchez-Soto “TBA”

19:00 – 22:00 CONFERENCE DINNER

Friday, May 17 (Hotel Belarus)

9:00 – 10:50 Fr17A: Morning parallel session

Fr17A(A): Photons generation and detection

(Chairman: **Z. Ficek**)

A. Maitre “High Purcell, high brightness and superpoissonian emission for a single emitter plasmonic patch antenna”

E. Brambilla “Increasing the efficiency of parametric processes in nonlinear photonic crystals by using a structured pump”

A. Sokolov “A superconducting detector that counts microwave photons up to two”

B. Veklenko “A New Method for solving the Equations of Quantum Electrodynamics and Applications”

Fr17A(B): Collective effects (Chairman:

J. Piilo)

E. Witkowska “Spin-squeezed atomic crystal”

D. Ivanov “Feedback Control of Quantum Phase Transitions”

Y. Wang “Single-photon bound states in atomic ensembles”

J. Krzywda “Theory of coherent spin transfer between two Silicon quantum dots”

10:50 – 11:30 Coffee break

11:30 – 12:50 Fr17B: Afternoon parallel session

Fr17B(A): Cold atoms for quantum

information processing (Chairman:

T Golubeva)

I. Ryabtsev “Three-Body Interactions of Rydberg Atoms for Quantum Information Processing”

S.Y. Lan “Light storage in a hollow-core fiber”

A. Manukhova “Pulsed Atomic-Optomechanical QND Gate Beyond Entanglement”

Fr17B(B): Quantum communication (Chairman:

A. Isar)

M. Thornton “Continuous-Variable Quantum Digital Signatures Over Insecure Channels”

Yu. Kurochkin “Quantum key distribution field test with polarization states”

V. Chistiakov “Twin-Field Subcarrier Wave Quantum Key Distribution System”

T. Mihaescu “Evolution of Quantum Steering in a Gaussian Noisy Channel”

13:00 – 13:15 Conference Closing

POSTER SESSION PROGRAM

Tuesday, May 16, 18:00-20:00. Hall C

- Tu14P-2 **B. Bessire** "Super-Resolution Quantum Imaging at the Heisenberg Limit"
- Tu14P-3 **V. Chizhevsky** "Impact of optical feedback on multistability and statistical properties of polarization noise in a multimode VCSEL"
- Tu14P-4 **V. Chizhevsky** "Electrooptical Spiking Neuron on the Base of a Vertical-Cavity Surface-Emitting Laser and a Single Photon Avalanche Diode"
- Tu14P-5 **M. Eskandari** "Unambiguous discrimination of quantum states for quantum key distribution"
- Tu14P-6 **D. Filimonenko** "Weak magnetic field resonances in magnetic field dependent luminescence spectra of the ensemble of NV centers in diamond"
- Tu14P-7 **A. Gabdulin** "Studies in the volume and properties of bound bipartite entangled states via the best separable approximation"
- Tu14P-8 **A. Gaidash** "Methods of revealing unambiguous state discrimination attack on subcarrier wave quantum key distribution system"
- Tu14P-9 **K. Karimullin** "Low-temperature luminescence spectroscopy of nanocomposites with colloidal CdSe quantum dots: study of electron-phonon interaction"
- Tu14P-10 **I. Karuseichyk** "Optimal Correlation Width for Quantum Imaging"
- Tu14P-11 **P. Klag** "Undulators as photon sources for relativistic interferometry"
- Tu14P-12 **M. Korolkov** "Avalanche-like Behavior of Up-conversion Luminescence Caused by the Nonlinear Coupling of the Pumping Rates in Two Channels."
- Tu14P-13 **A. Kozubov** "Analysis of quantum dynamics of multimode weak coherent states and their information properties "
- Tu14P-16 **A. Nelyubov** "Low-temperature study of PLE spectra of GeV centers in CVD diamonds "
- Tu14P-17 **A. Nizovtsev** "Hyperfine characteristics of quantum registers NV-13C in diamond nanocrystals formed by seeding approach from isotopic aza-adamantane and methyl-aza-adamantane"
- Tu14P-18 **A. Nizovtsev** "Spatial and hyperfine characteristics of SiV- and SiV+ color centers in diamond"
- Tu14P-19 **V. Nordgren** "Ancilla Controlled Quantum Computation for Discrete and Continuous Variable Hybrid Systems"
- Tu14P-20 **P. Novik** "Superresolving Quantum Imaging: Going Beyond Cramer-Rao Bound Due to Constraints"
- Tu14P-21 **P. Pandya** "Hilbert-Schmidt distance and entanglement witnessing"
- Tu14P-22 **I. Peshko** "Superresolution and overcoming "Rayleigh catastrophe" via delayed correlations measurement"
- Tu14P-23 **A. Pushkarchuk** "DFT simulation of stability and spin properties of fullereneol - based conjugates as potential elements of magnetic resonance imaging contrast agents"
- Tu14P-24 **A. Pushkarchuk** "Germanium-vacancy color center in volume and near surface of diamond: DFT simulation of spin properties "
- Tu14P-25 **A. Środa** "Review and Prospects of Stochastic Optical Fluctuation Imaging"
- Tu14P-26 **E. Samsonov** "Modeling Grover's algorithm implementation in a linear optical chip"
- Tu14P-27 **E. Smirnova** "Fluorescence Excitation and Emission Spectra Shown by Two Coupled Light Emitters Confined in a Dielectric Host "
- Tu14P-28 **I. Sokolov** "Cavity-assisted squeezing and entanglement: Non-adiabatic effects and optimal cavity-atomic ensemble matching"
- Tu14P-29 **B. Woloncewicz** "General mapping of multi qudit entanglement conditions to non-separability indicators for quantum optical fields"
- Tu14P-30 **E. Zenkevich** "Temperature Dependent Exciton-Phonon Coupling in Nanoassemblies Based on Semiconductor Quantum Dots and Dye Molecules"