

Kazan Federal University
Tatarstan Academy of Sciences
Kazan E.K. Zavoisky Physical-Technical Institute
Russian Foundation for Basic Research

**XXI INTERNATIONAL YOUTH SCIENTIFIC
SCHOOL "COHERENT OPTICS AND OPTICAL
SPECTROSCOPY"**

Program

October 17-19, 2017
Kazan

PROGRAM COMMITTEE

Naumov Andrei Vitalievich – Program Committee co-chairman

Dr. Sc. (Phys.-Math.), Scientific vice-director of the Institute for Spectroscopy
RAS

Gabitov Ildar Ravilievich – Program Committee co-chairman

Dr. Sc. (Phys.-Math.), Director of the Skoltech Center for Photonics and Quantum
Materials, Russia, professor at University of Arizona, USA

Salakhov Myakzyum Khalimulovich

Dr. Sc. (Phys.-Math.), President of the Tatarstan Academy of Science

Samartsev Vitaly Vladimirovich

Dr. Sc. (Phys.-Math.), member of the Russian Academy of Natural Science,
Professor at Kazan E. K. Zavoisky Physical -Technical Institute (KPhTI)

Gainutdinov Renat Khamitovich

Dr. Sc. (Phys.-Math.), Professor at KFU

ORGANIZATION COMMITTEE

Salakhov Myakzyum Khalimulovich – Rector of the School

Samartsev Vitaly Vladimirovich – Vice-rector of the School

Kamalova Dina Ilevna – Scientific Secretary of the School

**XXI INTERNATIONAL YOUTH SCIENTIFIC SCHOOL "COHERENT
OPTICS AND OPTICAL SPECTROSCOPY"**

Kazan, 17 - 19 October 2017.

We are pleased to invite you to participate in XXI International Youth Scientific School "Coherent optics and optical spectroscopy".

Lectures and reports will be held in the conference hall of the NIKOLAI LOBACHEVSKY SCIENTIFIC LIBRARY of Kazan Federal University (35 Kremlyevskaja st., Kazan, Russia).

The School will start on ***17 October 2017 at 10.00 AM***.

Registration of participant is on ***17 October*** at ***9.30 AM*** in the foyer of the Nikolai Lobachevsky Scientific library.

Papers are accepted by registration.

PROGRAM

Tuesday, October 17, 2017

MORNING SESSION

*Chairmen – prof. Salakhov M.Kh.,
prof. Samartsev V.V.*

10.00 **Opening of the School**

Rector of the School, President of the Academy of Science of Republic of Tatarstan, Prof. Salakhov M.Kh.

Director of the Institute of Physics Nikitin S.I.

Chairman of the Program Committee, Prof. Naumov A.V.

Vice-rector of the School, Prof. Samartsev V.V.

10.20 **Prof. Naumov A.V.**

(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)

Lecture: Electron-phonon interaction in impure disordered solid media at low temperatures: microscopic nature and manifestation in the spectra of single molecules

11.00-11.20 **Coffee-break**

11.20 **Prof. Sazonov S.V.**

(National Research Centre «Kurchatov Institute», Moscow, Russia)

Lecture: On the phase and group velocities of optical solitons

12.00 **Prof. Gainutdinov R.Kh.**

(Kazan Federal University, Kazan, Russia)

Lecture: Quantum computer science and the laws of the microworld

12.40-14.00 **Dinner**

EVENING SESSION

Section "Nanooptics"

Chairman – Prof. Sazonov S.V.

- 14.00 **Eremchev I.Yu.**, Eremchev M.Ju., Naumov A.V.
(*Institute for Spectroscopy RAS, Troitsk, Moscow, Russia*)
Supper-resolution luminescence microscopy of single semiconductor nanocrystals
- 14.15 **Valitova A.F.**, Koryukin A.V., Khamadeev M.A.
(*Kazan Federal University, Kazan, Russia*)
Spectrophotometry of hybrid plasmonic-photonic crystals
- 14.30 **Ziyatdinova K.A.**, Gainutdinov R.Kh., Khamadeev M.A.
(*Kazan Federal University, Kazan, Russia*)
The effect of anisotropy on the spontaneous emission in a medium of the photonic crystal
- 14.45 **Rogov A.M.**, Vorobev V.V., Osin Y.N., Nuzdin V.I., Valeev V.F., Stepanov A.L.
(*Kazan Federal University, Kazan, Russia*)
New-Type SERS-Active Substrates Formed with low-dose Ag Ion Implantation of semiconductive materials
- 15.00 **Kharintsev S.S., Saparina S.V.**, Fishman A.I., Stolov A.A.
(*Kazan Federal University, Kazan, Russia*)
Sensing carbon allotropes in protective coatings on optical fibers with far- and near-field Raman spectroscopy and microscopy
- 15.15-15.30 *Coffee-break*
- 15.30 **Khaidarova A.R.**, Konovalova O.A.
(*Kazan National Research Technical University, Kazan, Russia*)
Study of modified porous medical membranes by atomic force microscopy
- 15.45 **Kharitonov A.V.**, Kharintsev S.S., Salakhov M.Kh.
(*Kazan Federal University, Kazan, Russia*)
Plasmon-assisted amplification of localized optical signals with refractory nanocompounds
- 16.00 **Chernykh E.A.**, Kharintsev S.S.
(*Kazan Federal University, Kazan, Russia*)
Photoinduced heating of thin azopolymer films

Wednesday, October 18, 2017

MORNING SESSION

Chairman – Prof. Samartsev V.V.

10.00 **Prof. Bukharaev A.A.**

(Zavoisky Physical-Technical Institute, Kazan, Russia)

Lecture: Scanning probe microscopy of magnetic micro- and nanostructures

10.40-11.00 **Coffee - break**

11.00 **Kharintsev S.S.**

(Kazan Federal University, Kazan, Russia)

Lecture: Nonlinear plasmonics of refractory materials

11.40 **Prof. Leukhin A.N.**

(Mari State University, Yoshkar-Ola, Russia)

Lecture: Space and airborne radiolocation of terrestrial mobile objects in the mode of synthesizing the antenna aperture

12.20-14.00 **Dinner**

Section "Optical spectroscopy"

Chairman – Prof. Maimistov A.I.

14.00 **Gladush M.G.**

(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)

Fluorescence of ensembles of point quantum emitters in a dielectric medium

14.15 **Anikushina T.A., Naumov A. V., Kador L.**

(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)

Local field Effects in the optical spectra of single impurity molecules in solid matrices

14.30 **Ryabochkina P.A., Volkova T.V., Borik M.A., Lomonova E.E.,**

Myzina V.A., Tabachkova N.Yu., Chabushkin A.N.

(Ogarev Mordovia State University, Saransk, Russia)

Structure, phase composition and spectral-luminescence properties of crystals ZrO_2 - Y_2O_3 - Eu_2O_3 and ZrO_2 - Gd_2O_3 - Eu_2O_3

- 14.45 Shmelev A.G., **Zharkov D.K.**, Leontyev A.V., Nikiforov V.G., Lobkov V.S., Samartsev V.V.
(*Zavoisky Physical-Technical Institute, Kazan, Russia*)
Luminescence kinetics of CdSe-based quantum dots in toluene
- 15.00 **Abdrazakova L.R.**, Kamalova D.I.
(*Kazan Federal University, Kazan, Russia*)
Free volume in binary blends of polymers treated with supercritical CO₂: IR spectroscopy of conformational probes
- 15.15-15.30 *Coffee break*
- 15.30 **Sabirov T.N.**, Smirnov M.A., Gerasimov K.I.
(*Kazan National Research Technical University, Kazan, Russia*)
Laser spectroscopy of 7LiYF₄ crystals activated by rare-earth ions
- 15.45 **Savchenko E.A.**, Velichko E.N., Aksenov E.T., Rozov S.V.
(*Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia*)
Light scattering in albumin solution under the influence of electric field in the regime of total internal reflection

Section "Problems of quantum optics"

Chairman – Prof. **Naumov A.V.**

- 16.00 **Arzhanov A.I.**, Karimullin K.R., Naumov A.V.
(*Institute for Spectroscopy RAS, Troitsk, Moscow, Russia*)
Incoherent photon echo in an ensemble of semiconductor colloidal quantum dots: the temperature dependence of the inverse optical dephasing time
- 16.15 **Melnik K.S.**, Arslanov N.M., Bannik O.I., Gilyazov L.R., Egorov V.I., Gleim A.V., Moiseev S.A.
(*Kazan Quantum Center, Kazan National Research Technical University, Kazan, Russia*)
Heterodyne detection scheme for quantum communication system at subcarrier wave

Thursday, October 19, 2017

MORNING SESSION

Chairman – Prof. Gainutdinov R.Kh.

10.00 Basharov A.M.

(National Research Centre «Kurchatov Institute», Moscow, Russia)

Lecture: Interaction of broadband quantum fields with resonant atoms in second-order algebraic perturbation theory

10.40-11.00 Coffee break

11.00 Prof. Maimistov A.I.

(National Research University Moscow Engineering Physical Institute, Moscow, Russia)

Lecture: Electromagnetic waves in the waveguides manufactured from the unusual materials

11.40-12.00 Preparing for the poster section

12.00-14.00 Dinner

14.00-15.30 Poster section

Poster Section

Chairman – Sibgatullin M.E.

- 1. Akhmedshina E.N., Nefediev L.A., Garnaeva G.I., Zamaliev N.E.**
(Kazan Federal University, Kazan, Russia)
Information losses when recording the stimulated echo-hologram in gas media
- 2. Basharov A.M.**
(National Research Centre «Kurchatov Institute», Moscow, Russia)
Generation of terahertz impulse via an excited localized ensemble of identical particles with a permanent dipole moment
- 3. Gainutdinov R.Kh., Blum D.G., Mutygullina A.A.**
(Kazan Federal University, Kazan, Russia)
Nonperturbative effects in self-energy functions of quantum dots coupled to an acoustic phonon reservoir

4. **Gazizov A.R.**, Salakhov M.Kh.
(*Kazan Federal University, Kazan, Russia*)
Evaluation of Polarized Tip-Enhanced Raman Spectra of Oriented Chromophore Covalently Bonded with Polymer Chain
5. **Gainutdinov A.R.**, Khamadeev M.A.
(*Kazan Federal University, Kazan, Russia*)
Determination of the porosity of silica microparticles by the refractive index matching method
6. Gainutdinov R.Kh., **Garifullin A.I.**, Ziyatdinova K.A., Khamadeev M.A., Salakhov M.Kh.
(*Kazan Federal University, Kazan, Russia*)
Electromagnetic mass of an electron in one-dimensional photonic crystal
7. Gainutdinov R.Kh., **Shirdelhavar A.**, Mutygullina A.A., Khamadeev M.A.
(*Kazan Federal University, Kazan, Russia*)
Control of emission spectrum of a quantum dot coupled to phonon and electron reservoirs
8. **Galiakhmetova D.I.**, Sibgatullin M.E., Galimullin D.Z., Kamalova D.I.
(*Kazan Federal University, Kazan, Russia*)
The effect of arbitrary noise on the efficiency of separation of components of a complex spectral contours using the algorithm of artificial immune system
9. **Garnaeva G.I.**, Nefediev L.A., Ahmedshina E.N.
(*Kazan Federal University, Kazan, Russia*)
Effect on reproducibility of the temporary shape of the stimulated echo-hologram of collisions with change of particle speed in a gas
10. **Gilmanova G.A.**, Nizamova E.I., Nefediev L.A.
(*Kazan Federal University, Kazan, Russia*)
Phase memory and coherence in a three-level system with the stability of spatially inhomogeneous electric fields
11. **Golubev A.N.**, Nikitin S.I., Mumdghi I.E., Gilyazov L.R.
(*Kazan Federal University, Kazan, Russia*)
Complex Downhole Optical Fluid Analyser
12. **Zuev D.V.**, Sibgatoullin M.A.
(*Kazan Federal University, Kazan, Russia*)
Denoising complex optical spectra using of wavelet analysis

13. **Kolchinskiy I.M.**
(*Institute for Spectroscopy RAS, Troitsk, Moscow, Russia*)
Fluorescent nanoscopy: diagnostics of the structure and internal dynamics of condensed media
14. **Akhmadeev A.A., Koryukin A.V., Sitdikova A.F., Salakhov M.Kh.**
(*Kazan Federal University, Kazan, Russia*)
Modeling transmission light in photonic band gap of one-dimensional photonic-plasmonic crystals with buffer layer
15. **Magaryan K.A., Karimullin K.R., Eremchev I.Y., Vasilieva I.A., Naumov A.V.**
(*Institute for Spectroscopy RAS, Troitsk, Moscow, Russia*)
Microscopy of the small ensembles of the CdSe nanocrystals synthesized in the liquid crystal matrix
16. **Mamatova A.A., Savostina L.I.**
(*Kazan Federal University, Kazan, Russia*)
Quantum-chemical study of the parameters of NMR spectra of an α -casein molecule
17. **Morozova A.S., Ziganshina S.A., Bukharaev A.A., Ziganshin M.A.**
(*Kazan Federal University, Kazan, Russia*)
AFM of GGG films on Si before and after the interaction with the organic vapors
18. **Naumova S.N., Kamalova D.I.**
(*Kazan Federal University, Kazan, Russia*)
FTIR spectroscopic study of conformational equilibria of substituted ethane in polyethylene glycols
19. **Nepomnyashchaya E.K., Savchenko E.A., Velichko E.N., Aksenov E.T.**
(*Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia*)
Main features of the laser correlation spectroscopic scheme for scattered radiation registration in biological applications
20. **Gilmanova G.A., Nizamova E.I., Nefediev L.A.**
(*Kazan Federal University, Kazan, Russia*)
Phase memory and coherence in a three-level system with the stability of spatially inhomogeneous electric fields

21. **Samartsev V.V., Mitrofanova T.G.**
(*Zavoisky Physical-Technical Institute, Kazan, Russia*)
Correlated induced electron and spin "gratings" and their application in femtosecond coherent spectroscopy and spintronics
22. **Sagitova A.V.**
(*Moscow State University, Moscow, Russia*)
Detector of bacteria based on scanning probe microscopy
23. **Sakhbieva A.R., Nefed'ev L.A., Garnaeva G.I.**
(*Kazan Federal University, Kazan, Russia*)
Logical operation of difference of sets images in the optical echo-holography
24. **Sakhovsky S.V., Sibgatullin M.E.**
(*Kazan Federal University, Kazan, Russia*)
Investigation of structure of complex noise in optical spectra using continuous wavelet analysis
25. **Fedyanin V.V., Karimullin K.R.**
(*Moscow State Pedagogical University, Moscow, Russia*)
Peculiarities of numerical modeling of photon echo excited by incoherent laser impulses
26. **Smirnov M.A., Perminov N.S., Nigmatullin R.R., Talipov A.A., Moiseev S.A.**
(*Kazan National Research Technical University, Kazan, Russia*)
Using ranged amplitudes for characterization of SPAD dark counts
27. **Tarankova D.Yu., Perminov N.S.**
(*Kazan National Research Technical University, Kazan, Russia*)
Quantum informatics of the future: controllable spectroscopy
28. **Tarankova D.Yu., Perminov N.S., Smirnov M.A.**
(*Kazan National Research Technical University, Kazan, Russia*)
Statistical Passport of Noise of a White Light-Emitting Diode
29. **Tarasov S.O., Arslanov N.M., Andrianov S.N., Moiseev S.A.**
(*Kazan Quantum Center, Kazan National Research Technical University, Kazan, Russia*)
Controlled transfer and blockage in atom-photon transistor
30. **Hakimzyanova E.I., Nefediev L.A., Garnaeva G.I.**
(*Kazan Federal University, Kazan, Russia*)
Correlation of the temporal form of the object laser pulse and stimulated photon echo depending on the duration of the exciting laser pulses

31. **Biziyaev D.A., Bukharaev A.A., Chirkov V.V., Chuklanov A.P., Khanipov T.F., Nurgazizov N.I.**
(Zavoisky Physical-Technical Institute, Kazan, Russia)
Investigation by MOKE and MFM of the domain structure transformation under mechanical deformations in permalloy microparticles
32. **Chukhnova E.Ya., Koryukin A.V., Khamadeev M.A.**
(Kazan Federal University, Kazan, Russia)
Application of photonic crystals in plasmonics
33. **Shmakova A.L., Koryukin A.V., Khamadeev M.A.**
(Kazan Federal University, Kazan, Russia)
Sensors based on photonic crystals and plasmonic structures
34. **Smirnova E.A., Gladush M.G.**
(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)
Kinetics of luminescence of an inhomogeneous ensemble of quantum emitters
35. **Golovanova A.V., Gladush M.G., Naumov A.V.**
(Moscow State Pedagogical University, Moscow, Russia)
Mapping of material characteristics of a medium using fluorescence nanoscopy techniques
36. **Tarasevich A.O., Eremchev M.Yu., Naumov A.V., Eremchev I.Yu.**
(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)
Single pairs of quantum dots: determination of the distance between emitters with nanometer accuracy
37. **Savostianov A.O.**
(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)
Spectroscopy of molecular metal-organic complexes with high temporal and spectral resolution
38. **Karimullin K.R., Arzhanov A.I., Magaryan K.A., Naumov A.V.**
(Institute for Spectroscopy RAS, Troitsk, Moscow, Russia)
Luminescent microspectroscopy as a method for characterizing the optical properties of nanocomposites with colloidal semiconductor quantum dots
39. **Galimullin D.Z., Denisov A.I., Denisova N.V., Sibgatullin M.E.**
(Kazan Innovative University, Kazan, Russia)
Development of technology for state registration signs of the vehicles recognition in conditions of low resolution on the basis of gradient busting and convolutional neural networks

40. **Kazakov S.V.**, Galimullin D.Z., Sibgatullin M.E., Denisov A.I.,
Denisova N.V.
(Kazan Innovative University, Kazan, Russia)
Optimization of the structure and speed of the convolutional neural network
with learning on synthetic data when recognizing noisy images of symbols

41. **Tarasov S.O.**, Moiseev S.A.
*(Kazan Quantum Center, Kazan National Research Technical University,
Kazan, Russia)*
Controlled transfer and blockage in atom-photon transistor

15.30-16.00 *Coffee break*

16.00 Closing ceremony of the School.