

International Conference

# **Days on Diffraction 2023**

June 5 – 9, 2023

St. Petersburg

## **Program**

**of Workshop on wave phenomena  
in complex structures**

# Workshop on wave phenomena in complex structures

**Monday, June 5, 2023**

**ITMO University, Lomonosova ul. 9**

16.30 **Registration**

17.00 **Welcome Reception**

**Tuesday, June 6, 2023**

**ITMO University, Lomonosova ul. 9**

09.00 **Registration**

09.45 **Opening Ceremony**

	Chair: Dmitry Bykov
10.00	<b>(Invited talk)</b> V.V. Klimov “Perfect invisibility modes in dielectric nanoparticles”
10.20	<u>D.A. Chermoshentsev</u> , E.V. Anikin, S.A. Dyakov, N.A. Gippius “Dyakonov surface states on confined interfaces”
10.35	<u>A.N. Shaley</u> , I.S. Lobanov, A.A. Bogdanov “Two approaches in defining topological charge of bound states in the continuum in multipolar lattices”
10.55	<u>E. Barredo-Alamilla</u> , M.A. Gorlach “Unconventional axion response in metamaterial”
11.10	E.F. Grekova “Reduced complex linear viscoelastic media as acoustic metamaterials”

11.30 **Coffee break**

	Chair: Vasily Klimov
12.00	A.V. Nasedkin “About efficiency of piezoelectric transducers from porous piezoceramics when operating at electrical resonance and antiresonance frequencies”
12.20	<u>K.S. Chernova</u> , A.A. Stepanenko, M.A. Gorlach “Quantum state transfer via topological pumping in a qubit array”
12.35	<u>A.V. Korotchenkov</u> , N.S. Averkiev “Optical alignment of hot excitons in metal-semiconductor nanostructures”
12.55	<u>V. Labuntsov</u> , D.O. Gagarinova, L.V. Mikhailova, A.A. Otroshchenko, S.A. Pliastcov, I.A. Gladskikh, M.V. Zyuzin, L.I. Fatkhutdinova, A.A. Bogdanov “On chip refractive index sensing with plasmonic structures”
13.10	<b>(Invited talk)</b> <u>D.A. Bykov</u> , E.A. Bezus, L.L. Doskolovich “Resonances in guided-mode resonant gratings with linearly varying period”

13.30 **Lunch**

	Chair: Gleb Fedorov
15.00	(Invited talk) <u>A.V. Dostovalov</u> , A.A. Wolf, M.I. Skvortsov, Z.T. Munkueva, K.A. Bronnikov, S.A. Babin “Fiber Bragg gratings inscription in multicore and multimode fibers by femtosecond laser radiation”
15.20	<u>K.A. Bronnikov</u> , S.A. Gladkikh, A.A. Kuchmizhak, E.V. Mitsai, A.V. Dostovalov “Laser-induced periodic structures on amorphous germanium thin films”
15.35	<u>D.A. Litvinov</u> , O.M. Kushchenko, M.V. Rybin, A.D. Sinelnik “Tuning of Purcell factor by $\text{Ge}_2\text{Sb}_2\text{Te}_5$ ”
15.55	<u>L. Shaposhnikov</u> , M. Mazanov, D.A. Bobylev, M.A. Gorlach, F. Wilczek “Implementing axion electrodynamics equations in metamaterials”
16.10	(Invited talk) <u>A.V. Nikulin</u> , V.D. Burtsev, T.S. Vosheva, D.S. Filonov “Surface roughness simulations for 6G additive antennas”

## 16.30 Coffee break

	Chair: Alexander Dostovalov
17.00	<u>I. Deriy</u> , K. Lezhennikova, O. Yermakov, S. Glybovski, P. Belov, I. Iorsh, M. Song, A. Bogdanov “Anomalous reflection at the boundary of hyperbolic medium”
17.20	<u>D.P. Fedchenko</u> , I.V. Timofeev “Photonic topological insulator tight-binding model for Tamm plasmon-polariton based vertical-cavity laser array”
17.35	<u>F. Zhang</u> , H. Fan, M. Zu, Z. Wang, A.A. Bogdanov, M. Song “Exceptional point in a single dielectric ring resonator”
17.50	A.A. Bogdanov “Advanced fiber in-coupling with nanoprinted metastructures”

	Chair: Stanislav Baturin
10.00	D. Sakhno, E. Koreshin, <u>P.A. Belov</u> “Longitudinal electromagnetic waves supported by interlaced wire medium in wide frequency range”
10.20	<i>cancelled</i>
10.35	<b>(Invited talk)</b> A.V. Sadovnikov “Functional magnonic interconnection: spin-wave coupling and broken translational symmetry in magnonic structures”
10.55	<u>N.A. Lesiv</u> , A.M. Altmark “The structure of the force field of a relativistic charged particle and its effect on the dynamics of a charged particle beam”
11.10	<b>(Invited talk)</b> <u>S.N. Galyamin</u> , A.V. Tyukhtin “Rigorous methods of diffraction at the open-end of a dielectric-loaded circular waveguide”

11.30 **Coffee break**

	Chair: Pavel Belov
12.00	<b>(Invited talk)</b> <u>A.V. Tyukhtin</u> , S.N. Galyamin “Aperture method for calculation of bunch radiation in presence of dielectric objects”
12.20	<u>E.A. Buklakov</u> , J.-N. Roux, E.F. Grekova “Simulation of wave propagation in weakly cohesive powders by DEM”
12.35	<u>R. Nazarov</u> , Z. Sadrieva, A. Bogdanov “Transformation of bound states in the continuum due to permittivity changing in one-dimensional periodic structure of dielectric rods”
12.55	<u>P.A. Pantyukhina</u> , A.A. Bogdanov, K.L. Koshelev “Engineering the radiative lifetime of excitons in two-dimensional van der Waals heterostructures”
13.10	<b>(Invited talk)</b> A. Gorlach “Quantum-optical description of strongly driven systems”

13.30 **Lunch**

	Chair: Denis Baranov
15.00	<b>(Invited talk)</b> <u>D.N. Maksimov</u> , A.S. Kostyukov, A.E. Ershov, M.S. Molokeyev, E.N. Bulgakov, V.S. Gerasimov “Thermo-optic bistability with bound states in the continuum”
15.20	<u>A.A. Antonov</u> , M.V. Gorkunov “Dielectric Fourier metasurfaces for reconfigurable anomalous refraction at large angles”
15.35	<u>E. Koreshin</u> , I. Matchenya, G. Karsakov, D. Ilin, I. Iorsh, P. Belov “Electrostatic properties of finite slab of wire medium”
15.55	<u>A.Yu. Dmitriev</u> , A.V. Vasenin, S.A. Gunin, O.V. Astafiev “Nonlinear scattering of classical and non-classical signals on single superconducting artificial atom”
16.10	<u>V.M. Uzdin</u> , I.S. Lobanov “Three-dimensional topological structures in liquid crystals and magnets”

16.30 **Coffee break**

	Chair: Dmitrii Maksimov
17.00	<b>(Invited talk)</b> M.V. Gorkunov, C. Schäfer, <u>D.G. Baranov</u> “Chiral molecular polaritons: cavities, analytical models, and applications”
17.20	<u>I.I. Karavaev</u> , A.A. Bogdanov “Bound states in continuum and lattice resonances in dipole lattices”

17.35	<i>cancelled</i>
17.50	N.S. Solodovchenko “Light scattering from a ring resonator: dependence on the $R_{in}/R_{out}$ parameter”

	Chair: Sergey Dyakov
10.00	<u>A.V. Nasedkin</u> , A.A. Nasedkina, M.E. Nassar “Finite element investigation of disk transducers from porous piezoceramics of complex structure with cymbal end-caps in external medium”
10.20	<u>A.A. Antonov</u> , A.V. Mamonova, M.V. Gorkunov “Shaping quasi-bound states in the continuum for maximum optical chirality”
10.35	<u>G.V. Shadrina</u> , E.N. Bulgakov, A.F. Sadreev “Formation of super bound state in the continuum due to avoided crossing in grating”
10.55	<u>E. Levdik</u> , A.A. Shcherbakov “Application of tensor train decomposition to generalized source method for solving the grating diffraction problem”
11.10	<b>(Invited talk)</b> <u>A.V. Gapanovich</u> , <u>O.G. Romanov</u> “Light propagation in labyrinth-like photonic structures: numerical solution of Maxwell’s equations”

11.30 **Coffee break**

	Chair: Oleg Romanov
12.00	<b>(Invited talk)</b> <u>S.A. Dyakov</u> , D.A. Chermoshentsev, E.V. Anikin, S.S. Sidorenko, A. Kalganov, A. Dudnikova, M.F. Limonov, N.A. Gippius “Dyakov surface waves in confined media”
12.20	<u>M.E. Bochkarev</u> , N.S. Solodovchenko, K.B. Samusev, M.F. Limonov, “Light scattering from dielectric split ring resonator”
12.35	<u>A.I. Solomonov</u> , A.D. Sinelnik, M.V. Rybin “Controlling magnetic dipole resonances with a 2.5d metasurface”
12.55	A.A. Kutuzova “Anomalous Q-factor scaling laws of resonances related to bound states in the continuum”
13.10	<b>(Invited talk)</b> <u>A.K. Sarychev</u> , A.V. Ivanov “Electromagnetic theory of SERS effect of molecules encapsuled in spherical metal shell”

13.30 **Lunch**

	Chair: Aleksandr Solomonov
15.00	<b>(Invited talk)</b> <u>L.L. Doskolovich</u> , A.I. Kashapov, E.A. Bezus, D.A. Bykov “Spatiotemporal transformation of optical signals with metal–dielectric–metal multilayers”
15.20	<u>V.D. Burtsev</u> , T.S. Vosheva, P.V. Semkin, S.A. Kuznetsov, D.S. Filonov “3D printed optimized phased array with volumetric emitters”
15.35	<u>O.M. Kushchenko</u> , I.I. Shishkin, M.V. Rybin, A.D. Sinelnik “Control of light direction by rewritable structures on GST”
15.55	<u>Y. Li</u> , S. Wan, S. Deng, Z. Deng, J. Shi, A.A. Bogdanov “Topological coding metasurface by encircling an exceptional point”
16.10	<b>(Invited talk)</b> <u>M.V. Gorkunov</u> , A.A. Antonov, Y.S. Kivshar “Maximum chiral light transformations by resonant dielectric metasurfaces”

16.30 **Coffee break**

	Chair: Leonid Doskolovich
17.00	<u>N.S. Salakhova</u> , I.M. Fradkin, S.A. Dyakov, N.A. Gippius, I.M. Fradkin “Optical properties of twisted photonic crystal lattices”
17.20	<u>I.A. Timoshchenko</u> , O.G. Romanov “Ultrafast photoacoustics of carbon micro- and nanostructures: modelling and applications”
17.35	<u>S.A. Gunin</u> , A.Yu. Dmitriev, A.V. Vasenin, K.S. Tikhonov, G.P. Fedorov, O.V. Astafiev “The quantum and classical field scattered on a single two-level system”

17.50	<u>M. Mazanov</u> , R.S. Savelev, M.A. Gorlach, A.S. Kupriianov, Z. He “Realizing multipolar higher-order topology in a multimode photonic waveguide lattice”
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	Chair: Ilya Sheinman
10.00	<b>(Invited talk)</b> <u>A.K. Sarychev</u> , A.V. Ivanov, I.V. Bykov, N.V. Bakholdin, K.E. Mochalov., M.S. Shestopalova, V.A. Gushchin, A. Nabiev, A. Sukhanova, A.F. Smyk, A. Shurygin “Planar SERS sensors for SARS-CoV-2 virus detection”
10.20	<u>A.P. Chetverikova</u> , N.S. Solodovchenko, K.B. Samusev, M.F. Limonov “Electromagnetic resonances of dielectric rings”
10.35	<u>A. Proskurin</u> , A. Dyshlyuk, A. Bogdanov, O. Vitrik “Analytical calculation of SPP generation with structured substrates”
10.55	<u>A.V. Mamonova</u> , V.V. Artemov, I.V. Kasyanova, I.V. Simdyankin, A.R. Geivandov, A.A. Ezhov, M.V. Gorkunov “Optimization of liquid crystal metasurfaces for versatile diffraction”
11.10	<b>(Invited talk)</b> <u>G.P. Fedorov</u> , O.V. Astafiev “Experimental investigation of microwave light interaction with superconducting artificial atom arrays”

11.30 **Coffee break**

	Chair: Evgeni Bezus
12.00	<b>(Invited talk)</b> <u>I.M. Fradkin</u> , S.A. Dyakov, N.S. Solodovchenko, M.V. Rybin, M.F. Limonov, N.A. Gippius “Homogenization of Mie-resonant metamaterials”
12.20	<u>I.D. Solomakhin</u> , G.P. Fedorov “Compact lumped superconducting resonators for topological quantum simulators”
12.35	<u>M.A. Sogrin</u> , M.V. Rybin, E.E. Maslova “Influence of structural disorder on the metamaterial regime”
12.55	<i>cancelled</i>
13.05	<b>(Invited talk)</b> P. Ginzburg “Electromagnetic properties of theranostic vaterite in drug delivery applications”

13.25 **Lunch**

	Chair: Ilia Fradkin
15.00	<b>(Invited talk)</b> I.L. Sheinman “Waveguides with dielectric filling: accelerating and undulator wakefield structures”
15.20	<u>M.S. Mikhailovskii</u> , M.A. Poleva, M.S. Sidorenko, Z.F. Sadrieva, M.I. Petrov, A.A. Bogdanov, R.S. Savelev “High-Q band-edge resonances in one-dimensional arrays of dipolar scatterers”
15.40	<u>E.A. Bezus</u> , D.A. Bykov, L.L. Doskolovich “Resonant optical properties of metal-dielectric and all-dielectric nanophotonic structures integrated into a slab waveguide”
16.00	G.A. Romanenko, <u>P.S. Pankin</u> , D.S. Buzin, D.N. Maksimov, V.S. Sutormin, S.V. Nabol, A.I. Krasnov, F.V. Zelenov, A.N. Masyugin, S.V. Nedelin, N.A. Zolotovskiy, I.A. Tambasov, M.N. Volochaev, K.-P. Chen, I.V. Timofeev “Temporal coupled mode theory for hybrid metal-dielectric resonator”
16.20	<b>(Invited talk)</b> <u>S.A. Dyakov</u> , N.S. Salakhova, I.M. Fradkin, N.A. Gippius “Purcell effect in a bilayer of twisted dielectric photonic crystal slabs”

16.40 **Closing ceremony**