

International Conference

# **Days on Diffraction 2025**

June 16 – 20, 2025

St. Petersburg

**Program**

**Monday, June 16, 2025**

10.55 *Greetings*

	<b><i>Optics (I)</i></b> Chair: Nikolay Rosanov
11.00	<b>S.V. Fedorov</b> , N.A. Veretenov, N.N. Rosanov: Knotted polarization of short electromagnetic pulses
11.20	<b>B.P. Lapin</b> , E.V. Makurina, M.A. Yavorsky, C.N. Alexeyev: Dispersion of optical vortices in twisted anisotropic optical fibers with torsional mechanic stress
11.40	<b>A.B. Plachenov</b> : Modified “complex source” solutions which are regular in whole space
12.00	<b>N.A. Vlasov</b> , V.P. Panurchenko, R. Nazarov, S.S. Baturin, E.E. Maslova, Z.F. Kondratenko: Theoretical investigation on possible indices of electromagnetic multipoles’ singularities

12.20 *Coffee break*

	<b><i>Optics (II)</i></b> Chair: Maxim Yavorsky
12.40	<b>N.N. Rosanov</b> : Electric area of a pulse reflected by a thin layer of a medium with finite transverse dimensions
13.00	<b>D.V. Vikulin</b> , D.Y. Yavorsky, B.P. Lapin, C.N. Alexeyev, M.A. Yavorsky: Inversion of circular polarization in anisotropic optical fibers with torsional acoustic wave
13.20	<b>N.A. Veretenov</b> , S.V. Fedorov, N.N. Rosanov: Non-coherent coupling of one-dimensional vector laser solitons
13.40	A.B. Plachenov, <b>A.P. Kiselev</b> : A finite-energy unidirectional solution of the wave equation with unexpected behavior at infinity

14.00 *Lunch*

	<b><i>Electromagnetics &amp; radiophysics (I)</i></b> Chair: Tatiana Zaboronkova
14.40	A.V. Kudrin, <b>T.M. Zaboronkova</b> , A.S. Zaitseva, N.V. Shchapina, N.V. Yurasova: Excitation of twisted waves by a circular phased array of loop antennas with the axes tangential to the array circumference in a magnetized plasma
15.00	D.V. Fateev, <b>K.V. Mashinsky</b> , O.V. Polischuk: Resonant transverse transformation of incident wave power flux by edge plasmons in a rectangular graphene ribbon
15.20	<b>O.M. Lecian</b> , B.B. Tirozzi: About some specifications of the Landau problem in the Trubnikov–Godfrey Relativistic formalism

15.40 *Coffee break*

	<b><i>Electromagnetics &amp; radiophysics (II)</i></b> Chair: Tatiana Zaboronkova
16.00	O.M. Lecian, <b>B.B. Tirozzi</b> : On the Trubnikov–Lamborn Relativistic plasma dispersion relations
16.20	<b>V.V. Zalipae</b> v, V.K. Dubrovich: Excitation of localized beams by electric dipole sources embedded into metamaterial dielectric layer
16.40	<b>Anjali</b> , A. Tomar, A. Chauhan: Interaction on shock waves in non-ideal magnetogasdynamics

**Tuesday, June 17, 2025**

	<b><i>Mathematical approaches (I)</i></b> Chair: Ekaterina Zlobina
11.00	<b>S.A. Rukolaine:</b> Analytical representation of heat waves on a finite interval in the framework of the hyperbolic heat equation
11.20	<b>M. Imagawa,</b> Y. Iso: Sharp estimates in singular perturbation applied to the first order partial differential equations in a bounded domain
11.40	<b>R.M. Feshchenko:</b> On the exact transparent boundary condition for the 1D Schrödinger equation with linear potential
12.00	<b>M.A. Lyalinov,</b> S.V. Polyanskaya: Three identical quantum particles on a straight line with contact interaction in pairs as a solvable problem

12.20 ***Coffee break***

	<b><i>Asymptotic methods (I)</i></b> Chair: Aleksei Kiselev
12.40	<b>O.M. Kiselev:</b> Subresonance in the wave equation
13.00	<i>cancelled</i>
13.20	<b>S.D. Liazhkov:</b> Asymptotics of the fundamental solution describing ballistic heat transport in a harmonic square lattice
13.40	<b>V.A. Sergeev,</b> A.A. Fedotov: On adiabatic evolution generated by a one-dimensional Schrödinger operator. Solutions corresponding to continuous spectrum.
14.00	<b>E.A. Zlobina,</b> A.P. Kiselev: Paraxial diffraction by a delta potential

14.20 ***Lunch***

	<b><i>History of diffraction</i></b> Chair: Andrei Shanin
15.00	<b>P.A. Belov:</b> Development of metamaterials in Russia and former USSR
15.20	<b>A.P. Kiselev,</b> E.A. Zlobina: Parabolic-equation approach to high-frequency grazing diffraction theory: from Leontovich and Fock to nowadays
15.40	<b>A.V. Popov:</b> G.D. Malyuzhinets' contribution to development of the parabolic equation method
16.00	<b>G.S. Chekmarev,</b> M.E. Bochkarev, N.S. Solodovchenko, K.B. Samusev, M.F. Limonov: From Fano resonances to Fano combs
16.20	<b>M.F. Limonov:</b> The history of superconductivity: from Nobel prizes to prison

**Wednesday, June 18, 2025**

	<b><i>Mathematical approaches (II)</i></b> Chair: German Zavorokhin
11.00	<b>S.A. Nazarov</b> : Localization of eigenfunctions in a thin-walled faceted Dirichlet glass
11.20	A.A. Matskovskiy, <b>G.L. Zavorokhin</b> : On the existence of elastic waves in topographic waveguides
11.40	A.S. Poretskii, <b>D.S. Smorchkov</b> : Scattering and radiation of acoustic waves in discrete waveguides with several cylindrical outlets to infinity
12.00	N.G. Kuznetsov, <b>O.V. Motygin</b> : Sloshing in vertical cylinders with circular walls and porous, radial baffles: examples of explicit solutions
12.20	A.A. Dyundyaeva, <b>S.V. Tikhov</b> , D.V. Valovik: Propagation of coupled TE-TE waves in an open spatially inhomogeneous nonlinear slab

12.40 **Coffee break**

	<b><i>Numerical approaches (I)</i></b> Chair: Leonid Goray
13.00	Y. Shuai, <b>A.G. Maslovskaya</b> : Evolution of travelling wave-fronts in Allen–Cahn model applied to microbial population dynamics
13.20	<b>M.V. Altaisky</b> , N.E. Kaputkina: Quantum reservoir computing on decoherence-free subspaces
13.40	<b>L.I. Goray</b> : Blazed gratings: effect of antiblaze angle on diffraction efficiency at normal and grazing light incidence
14.00	<b>I.A. Bareiko</b> , M.V. Vareldzhan, A.A. Eremin: Evaluation of elastic guided wave dispersion curves in multilayered composite materials with NVIDIA CUDA technology
14.20	H. Tiwari, <b>A. Tomar</b> , A. Chauhan: Semi-analytical solutions of (2+1)-dimensional biological population model using Homotopy Analysis Method

14.40 **Coffee break**

	<b><i>Numerical approaches (II)</i></b> Chair: Anna Maslovskaya
15.00	<b>D.A. Barykin</b> , N.A. Kostromin, L.I. Goray, A.S. Dashkov: Towards full numerical construction of modern Mid-IR optical sensors
15.20	<b>V.A. Es'kin</b> , E.V. Ivanov: Physics-informed neural networks and neural operators for a study of EUV electromagnetic wave diffraction from a lithography mask
15.40	<b>W. Pauls</b> : Matrix representations of the group of formal diffeomorphisms and their applications
16.00	<b>N.A. Kostromin</b> , D.A. Barykin, L.I. Goray, A.S. Dashkov: Advanced software development for modeling transmission/reflection spectra and non-contact diagnostics

**Thursday, June 19, 2025**

	<b><i>Diffraction</i></b> Chair: Victor Zalipaev
11.00	<b>K.S. Kniazeva</b> , E.L. Shelest, A.V. Shanin: Description of plates with Matrix Klein–Gordon equation
11.20	V.G. Farafonov, <b>D.G. Turichina</b> , V.B. Il'in, S.I. Laznevoi: On the scattering of light by a spheroidal particle with a spherical core
11.40	A.V. Shanin, R.C. Assier, A.I. Korolkov, <b>O.I. Makarov</b> : Far-field asymptotics of the Green's function near the Dirac point for a triangular phononic crystal
12.00	<b>N.D. Aniutin</b> : Diffraction of H-polarized plane electromagnetic wave by a VO <sub>2</sub> ring: transition from dielectric scattering to plasmons modes

12.20 ***Coffee break***

	<b><i>Acoustics and elastic waves (I)</i></b> Chair: Natalia Glushkova
12.40	<b>E.V. Glushkov</b> , N.V. Glushkova, V.A. Polezhaeva, A.A. Tatarkin: Resonance effects associated with mode repulsion and their use in ultrasonic inspection of layered materials
13.00	<b>O.A. Ermolenko</b> , E.V. Glushkov, N.V. Glushkova: Energy distribution of guided waves in fluid-loaded anisotropic laminate plates
13.20	<i>cancelled</i>
13.40	<b>M.A. Shilov</b> , E.A. Ivanova: Derivation of equations of the Cosserat continuum of a special type and their analysis in the context of the Schrödinger equation and the Klein–Gordon equation
14.00	<i>cancelled</i>

14.20 ***Lunch***

	<b><i>Acoustics and elastic waves (II)</i></b> Chair: Evgeny Glushkov
15.00	E.V. Glushkov, <b>N.V. Glushkova</b> , A.A. Eremin, A.A. Tatarkin, I.A. Bareiko, O.N. Kiselev: Modeling of guided wave excitation and propagation using experimentally determined effective elastic properties of layered waveguides
15.20	<b>A.A. Evdokimov</b> , P.A. Nets, A.A. Eremin: Hybrid numerical-analytical scheme for the elastodynamic simulation of layered elastic structures with multiple inhomogeneities
15.40	<b>A.V. Nasedkin</b> : Four sets of resonance frequencies of piezoelectric bodies and quality factors for vibrations at these frequencies
16.00	<b>M.V. Golub</b> , O.V. Doroshenko, S.I. Fomenko: In-plane elastic wave propagation through a damaged interface between dissimilar orthotropic media

**Friday, June 20, 2025**

	<b><i>Asymptotic methods (II)</i></b> Chair: Aleksei Kiselev
10.00	<b>A.V. Tsvetkova</b> : Semiclassical approximation for Jacobi polynomials, defined by a difference equation, and the Bessel function
10.20	<b>M.M. Votikova</b> : Asymptotics for long nonlinear coastal waves propagating along a sloping beach
10.40	<b>A.A. Zolotukhina</b> : Asymptotic solutions for water waves in a channel over a slow-varying bottom considering the reflection from a cross section wall
11.00	<b>M.V. Perel</b> : Mode transformation near degeneracy points of the crossing type for the 2D Dirac equation
11.20	<b>M.N. Demchenko</b> : Asymptotics of solutions to the characteristic problem for the ultrahyperbolic equation along null geodesics

11.40 ***Coffee break***

	<b><i>Asymptotic methods (III)</i></b> Chair: Sergey Dobrokhotov
12.10	A.V. Shanin, <b>A.Yu. Laptev</b> : Asymptotic evaluation of three-dimensional integrals with singularities in application to transient acoustic radiation
12.30	<b>M. Rouleux</b> : On the semi-classical magnetic Schrödinger operator
12.50	<b>A.I. Allilueva</b> : Short-wave solutions of the wave equation with localized velocity perturbations whose wavelength is not comparable to the scale of localized inhomogeneity. One-dimensional case
13.10	<b>O.A. Shchegortsova</b> : Isotropic surfaces and complex vector bundles corresponding to the Schrödinger equation with a delta potential

13.30 ***Lunch***

	<b><i>Asymptotic methods (IV)</i></b> Chair: Anna Tsvetkova
15.00	A.A. Chernyavskii, <b>D.S. Minenkov</b> , P.S. Petrov: Waves in round resonator with transparent walls, generated by a delta-force, and their relation to quasistationary (Gamow) states
15.20	<b>A.A. Tolchennikov</b> : Asymptotic solution of Maxwell's equation with localized right-hand side
15.40	<b>M.V. Babich</b> , L.A. Bordag, A. Khvedelidze, D. Mladenov: On spherical trigonometry in one-qubit gates theory and Gauss shoelace formula for sphere
16.00	<b>S.Yu. Dobrokhotov</b> , V.E. Nazaikinskii, I.A. Nosikov, A.A. Tolchennikov: Asymptotics of long waves in basins with shallow shores generated by spatially localized harmonic in time sources

# Program of the Mini-symposium “Inverse Problems”

**Monday, 16 June, 2025**

Chairman: **M.I. Belishev**

09.55–10.00	ZOOM check, greetings, hugs
10.00–10.40	<b>N.P. Bondarenko</b> : Uniform stability of the inverse problem for the non-self-adjoint Sturm–Liouville operator
10.45–11.25	<b>V.P. Krishnan</b> : A simple range characterization for spherical mean transform in odd and even dimensions
<i>Coffee break</i>	
11.40–12.20	A.S. Mikhaylov, <b>V.S. Mikhaylov</b> : Dynamic inverse problem for Jacobi matrices and complex moment problem

**Lunch**

14.00–14.40	M.I. Belishev, <b>S.A. Simonov</b> : A model and characterization of a class of symmetric semibounded operators
14.45–15.15	<b>N.N. Shilov</b> , A.A. Duchkov: A slope tomography algorithm based on the high-frequency asymptotics of the Double Square Root equation

**Tuesday, 17 June, 2025**

Chairman: **M.I. Belishev**

10.00–10.40	<b>N.Yu. Saburova</b> : On isospectral potentials on periodic discrete graphs
10.45–11.25	<b>D.V. Korikov</b> : Determination of conformal invariants of surface with boundary via its DN map
<i>Coffee break</i>	
11.40–12.20	<b>M.S. Lytaev</b> : Automatically differentiable parabolic equation for solving a class of inverse tomography problems

**Lunch**

14.00–14.40	<b>P.C. Kuo</b> , R.G. Novikov: Inverse scattering for the multipoint potentials of Bethe–Peierls–Thomas–Fermi type
14.45–15.25	<b>M.I. Belishev</b> : BC-method as a look at Inverse Problems
15.30–16.10	<b>Rakesh</b> : The fixed angle inverse scattering problem for Riemannian metrics