International Conference

Days on Diffraction 2022

May 30 – June 3, 2022

St. Petersburg

Program

Monday, May 30, 2022

	Diffraction (I) Chair: Andrei Shanin
11.00	**Mikhail A. Lyalinov**, Svetlana S. Polyanskaya: Schrödinger operator in a half-plane with singular δ-potential having the support on two half-lines: spectrum and eigenfunctions
11.20	**Popov, A.V.**, Feshchenko, R.M.: Transparent boundary conditions for subsurface sounding problems
11.40	**Ekaterina A. Zlobina**, Aleksei P. Kiselev: Detailed study of Alexey Popov's diffraction problem
12.00	**I.V. Andronov**: High-frequency diffraction by an elongated 3-axis ellipsoid
12.20	**Nethercote M.A.**, Kisil A., Assier R.C.: Acoustic wave resonance by a wedge of point scatterers

12.40	**Coffee break**

	Spectral theory methods Chair: Anton Savin
13.00	**M.N. Demchenko**: An estimate of the BMO-norm of a divergence-free vector field in terms of the associated paracommutator
13.20	**Saburova, N.Yu.**: Estimates of total bandwidth for magnetic Laplacians on periodic graphs
13.40	**Sadov, S.Yu.**, Kalachev, G.V.: Convolution maximizers in L_p: recent results and open questions
14.00	**Savin, A.Yu.**: An equivariant local index formula for the metaplectic group

14.20	**Coffee break**

	Electromagnetics & radiophysics Chair: Tatiana Zaboronkova
14.40	**Ivanova, E.A.**: Modeling of electrodynamic and thermodynamic processes by means of a micropolar continuum
15.00	Bazhilova, E.V., **Kudrin, A.V.**, Zaboronkova, T.M., Zaitseva, A.S.: Electrodynamic characteristics of a multigap loop antenna with phased excitation in a magnetoplasma
15.20	**Pavlichenko, I.A.**: Plasmon resonances of spherical semiconductor-metal core-shell nanostructure
15.40	**Prokopovich, I.V.**, Popov, A.V., Sakhterov, V.I., Morozov, P.A.: Radiation patterns of borehole GPR antennas
16.00	Ivoninsky, A.V., Kudrin, A.V., **Zaboronkova, T.M.**: Resonance scattering of an extraordinary wave by a smoothed-walled duct with decreased density in a magnetoplasma

Tuesday, May 31, 2022

	Diffraction (II) Chair: Mikhail Lyalinov
11.20	Shanin, A.V., Korolkov, A.I., **Laptev, A.Y.**: Experimental study of ultrasound diffraction by a thin cone using maximum length sequence method
11.40	**A.O. Subbotkin**, A.V. Shanin: Analysis of the oscillatory process inside an acoustic interference antenna
12.00	Shanin, A.V., Korolkov, A.I., **Kniazeva, K.S.**: On convergence of the ray generating function for a multilayered waveguide field
12.20	Farafonov, V.G., Turichina, D.G., **Il'in, V.B.**: Exact solution to the light scattering problem for a core-mantle spheroid with non-confocal layer boundaries
12.40	**Coffee break**
	Localized waves (I) Chair: Maria Perel
13.00	**V. Zalipaev**, L. Leibov, A. Ismagilov, B. Nasedkin, N. Petrov, A. Tsypkin: Modelling of ghost imaging reconstruction on the basis of pulsed radiation of Gauss–Laguerre and Gauss–Hermite beams in the terahertz range
13.20	**Gusev, V.A.**: Calculation of the field of the high intensive focused ultrasound beam using the modular nonlinearity model
13.40	**Petnikova, V.M.**, Makarov, V.A.: The role of Airy beam parameters in optical manipulation
14.00	**Barshak, E.V.**, Lapin, B.P., Vikulin, D.V., Alexeyev, C.N., Yavorsky, M.A.: Transformation of angular momentum of light in a system of anisotropic optical fibers
14.20	**Coffee break**
	Localized waves (II) Chair: Aleksei Kiselev
14.40	Babich, V.M., **Babich, M.V.**: Space-time ray method and quasi-photons for whispering gallery waves
15.00	Fedorov, S.V., Rosanov, N.N., **Veretenov, N.A.**: 2D-topological vectorial solitons in lasers with saturable absorption
15.20	**V. Zalipaev**, T. Zalialiutdinov, V. Dubrovich: Dynamics and radiation effects for charges propagating in ultraintense laser fields of Gaussian beams
15.40	Dobrokhotov, S.Yu., **Nazaikinskii, V.E.**: Approximation of radially symmetric Gaussian beams by Bessel and Airy functions

Wednesday, June 1, 2022

	Acoustics and elastic waves (I) Chair: Evgeny Glushkov
11.20	**Golub, M.V.**, Doroshenko, O.V., Gu, Y., Zhang, C.: Guided waves scattering by impact induced delaminations and sensing by piezoelectric sensors
11.40	**Wilde, M.V.**: Influence of the imperfect interlaminar contact on the edge waves in laminate structures with thin soft interlayers
12.00	**Fomenko, S.I.**, Khanazaryan, A.D., Sverkunova, D.A., Jana, R.B.: The influence of porosity and fluid saturation of soils on guided waves and the soils parameter estimation by ultrasound methods
12.20	**Golub, M.V.**, Doroshenko, O.V., Fomenko, S.I., Kozhevnikov, V.V., Wang, Y., Zhang, C.: Wave propagation in laminates and layered acoustic metamaterials with periodic arrays of cracks

12.40 **Coffee break**

	Acoustics and elastic waves (II) Chair: Mikhail Golub
13.00	**Ermolenko, O.A.**, Glushkov, E.V., Glushkova, N.V.: Simulation of wave processes in bone phantoms for osteoporosis diagnostics
13.20	**Glushkov, E.V.**, Glushkova, N.V., Ermolenko, O.A.: Asymptotics of reflected and transmitted elastic waves in an anisotropic two-layer half-space with a surface source
13.40	**Valeriy D. Lukyanov**, Lyudmila V. Nosova, Larisa N. Timofeeva: Analytical finding of eigenfrequencies of an elastic rod with impedance attachment ends
14.00	Petrov, P.S., **Tyshchenko, A.G.**: A numerical method for estimating anthropogenic acoustic noise levels using wide-angle Mode parabolic equations

14.20 **Coffee break**

	Numerical approaches Chair: Leonid Goray
14.40	Goray, L.I., **Dashkov, A.S.**: Simple neural networks and Bayesian methods for diffractions grating efficiency optimization
15.00	**Maslovskaya, A.G.**, Moroz, L.I.: Computational techniques for time-fractional modelling of thermal wave propagation in ferroelectrics
15.20	**Chebotarev, A.Yu.**, Kovtanyuk, A.E., Park, N.M.: Boundary optimal control of radiative-conductive heat transfer with reflection and refraction effects
15.40	**Vitalii N. Chukov**: Solution of the problem on the reciprocal lattice nodes of the Ewald circle of reflection without and with the account of the amplitude form-factor of a scattering lattice
16.00	**Goray, L.I.**: Diffraction on non-plane gratings irradiated by non-planar waves

Thursday, June 2, 2022

	Mathematical approaches of wave propagation (I) Chair: Pavel Petrov
12.40	**Ya.L. Bogomolov**, A.D. Yunakovsky: Artificial damping for hyperbolized nonlinear Schroedinger type equation. The case of unbounded operator
13.00	Valovik, D.V., **Tikhov, S.V.**: Mathematical aspects of monochromatic electromagnetic wave propagation in a plane waveguide filled with inhomogeneous nonlinear medium
13.20	**Feshchenko, R.M.**, Popov, A.V.: An exact transparent boundary condition for the 2D Helmholtz equation
13.40	**Ivanov, A.V.**: On hyperbolicity of close to piecewise constant linear cocycles over irrational rotations
14.00	**Petrov, P.S.**, Kazak, M.S., Katsnelson, B.G.: Excitation of whispering gallery waves in sea area with bowl-like bottom by an external source
14.20	**Coffee break**
	Mathematical approaches of wave propagation (II) Chair: Dmitry Valovik
14.40	**Dolinina, D.A.**, Yulin, A.V.: Spontaneous symmetry breaking in waveguide with periodic complex potential
15.00	**Altaisky, M.V.**, Kaputkina, N.E., Raj, R.: Multiresolution quantum field theory in infinite-momentum frame
15.20	**Peter G. Malischewsky**: Diabolical points and Rayleigh-wave propagation
15.40	Nikolay Kuznetsov, **Oleg Motygin**: Sloshing in a vertical-walled cylinder in the presence of a porous layer

Friday, June 3, 2022

	Asymptotic methods (I) Chair: Alexander Fedotov
11.00	**Anikin, A.Yu.**, Klevin, A.I.: Asymptotic solutions of Helmholtz equation in a strip with localized right-hand side for two-layer medium and application to acoustics
11.20	**Kalyakin, L.A.**: Perturbation of the simple dissipative wave
11.40	Dobrokhotov, S.Yu., **Tsvetkova, A.V.**: Asymptotics of multiple orthogonal Hermite polynomials $H_{n1,n2}(z,\alpha)$ determined by a third-order differential equation
12.00	**Sergeev, S.A.**: Asymptotic solution of the Cauchy problem for the wave propagation with time dispersion
12.20	**Tolchennikov, A.A.**: Solution of the two-dimensional massless Dirac equation with a linear potential and localized right hand side

12.40	**Coffee break**

	Asymptotic methods (II) Chair: Leonid Kalyakin
13.00	**Fedotov, A.A.**: On the spectrum of a quasiperiodic non-self-adjoint operator
13.20	**Klevin, A.I.**: New integral representations of the Maslov canonical operator with complex phases
13.40	**Perel, M.V.**: Asymptotic analysis of tunneling through a potential barrier in graphene in the presence of a magnetic field
14.00	**Borisov, D.I.**: Approximation of point interactions by geometric perturbations in two-dimensional domains
14.20	Anikin, A.Yu., **Rykhlov, V.V.**: Semiclassical approximation for bound states in graphene in magnetic field with small trigonal warping correction

14.40	**Coffee break**

	Water waves Chair: Anatoly Anikin
15.00	**Athanassoulis, A.G.**: Stochastic moment equations for ocean waves: Landau damping & rogue waves
15.20	**Nazarov, S.A.**: Interaction of distant spectral perturbations of the Neumann conditions in application to ice fishing
15.40	Dobrokhotov, S.Yu., **Minenkov, D.S.**, Nazaikinskii, V.E.: On asymptotic solutions of the Cauchy problem for the nonlinear system of shallow water equations in a basin with a shallow beach
16.00	Minenkov, D.S., **Votiakova, M.M.**: Asymptotics of the 1D shallow water equations in the form of running waves in a basin with variable bottom with vertical and gentle walls
16.20	**Zavorokhin, G.L.**, Kozlov, V.A., Nazarov, S.A.: Modeling of fluid flow in a flexible vessel with elastic walls

Program of the Mini-Symposium "Inverse Problems"

Chairman: **Mikhail Belishev**

Tuesday, 31 May, 2022

10.00−10.40	**G. Nakamura**: Classical unique continuation property for multi-term time-fractional evolution equations
10.45−11.25	**Rakesh**: Formally determined inverse problems for hyperbolic PDEs: Inverse problems
Coffee break	
11.40−12.20	**V.N. Sivkin**: Phase retrieval problem with background information

Lunch

14.00−14.40	**A.E. Kovtanyuk**, A.Yu. Chebotarev, T.E. Seleznev, R. Lampe: Cerebral oxygen transport model with unknown surface sources
14.45−15.25	**A.V. Kaplun**: Functional model of C*-algebra associated with a metric graph in the case of simple models

Wednesday, 1 June, 2022

10.00−10.40	**R.G. Novikov**: Reconstruction from the Fourier transform on the ball
10.45−11.25	M.I. Belishev, **D.V. Korikov**: Recent results on the two-dimensional Electric Impedance Tomography
Coffee break	
11.40−12.20	**M.M. Malamud**, A.A. Lunyov: On transformation operators and Riesz basis property of root vectors system for $n \times n$ Dirac type operators

Lunch

14.00−14.40	**I.V. Boikov**, V.A. Roudnev, A.I. Boikova: Application of spline collocation iteration method for solving direct and inverse scattering problems
14.45−15.25	A.S. Mikhaylov, **V.S. Mikhaylov**: Analog of de Branges spaces for the Schrödinger operator in a bounded domain

Thursday, 2 June, 2022

10.00−10.40	**T. Furuya**: Local recovery of a piecewise constant anisotropic conductivity in EIT on domains with exposed corners
10.45−11.25	**A.A. Timonov**: Deep learning and successive approximations for the BCM-based image enhancement
Coffee break	
11.40−12.20	**D.V. Korikov**: On stability of determination of Riemann surface from its DN-map
12.25−13.05	**P. Kurasov**: M-functions and metric graphs: hierarchy and inverse problems