

# Spectral Theory and Mathematical Physics

Euler International Mathematical Institute, St. Petersburg, Russia  
June 20–30, 2021

## PROGRAMS

### Buslaev conference (June, 20 – June, 22)

#### SUNDAY 20 June:

12:30–13:00: REGISTRATION

13:00–15:00: Lunch

15:00–15:50: Alexander Its (Indiana University – Purdue University Indianapolis, USA, and St. Petersburg State University, Russia). *Isomonodromy aspects of the  $tt^*$  equations of Cecotti and Vafa. Iwasawa factorization and asymptotics.*

15:50–16:05: Coffee break

16:05–16:55: Maxim Skriganov (St. Petersburg Department of Steklov Mathematical Institute, Russia). *Point distributions in compact Riemannian manifolds.*

17:00–17:50: Alexander Fedotov (St. Petersburg State University, Russia). *Monodromization for Schrödinger operators with meromorphic potentials.*

17:50–18:10: Coffee break

18:10–19:00 Leonid Pastur (B. Verkin Institute for Low Temperature Physics and Engineering, Ukraine). *Entanglement entropy of free disordered fermions and spectral theory (online talk).*

19:10–20:00: Estelle Basor (American Institute of Mathematics, USA). *Factoring Fredholm Determinants (online talk).*

#### MONDAY 21 June:

11:00–12:00: Free coffee and free discussions

12:00–12:50: Vladimir Nazaikinski (Ishlinsky Institute for Problems in Mechanics RAS, Russia). *Efficient semiclassical asymptotics.*

13:00–15:00: Lunch

15:00–15:50: Sergei Dobrokhotov (Ishlinsky Institute for Problems in Mechanics RAS, Russia). *Homogenization, adiabatic approximation and pseudodifferential operators.*

15:50–16:10: Coffee break

16:10–17:00: Mikhail Lyalinov (St. Petersburg State University, Russia). *Asymptotics for the eigenfunctions of Laplacians in some unbounded domains with Robin-type boundary conditions and functional equations.*

17:10–18:00: Percy Deift (Courant Institute of Mathematical Sciences, USA). *The open Toda chain with external forcing* (**online talk**).

18:30–21:00: Boat trip with a buffet

## **TUESDAY 22 June:**

10:00–10:50: Viktor Novokshenov (Institute for Mathematics UFRC RAS). *Autoresonance in a model of a terahertz wave generator.*

10:50–11:10: Coffee break

11:10–12:00: Vladimir Sukhanov (St. Petersburg State University, Russia). *Riemann–Hilbert approach to the inverse problem for the Schrödinger operator with quadratic potential.*

12:10–13:00: Andrei Prokhorov (University of Michigan and St. Petersburg State University). *Integrable structure for the multipoint distribution of TASEP.*

13:00–15:00: Lunch

15:00–15:50: Mikhail Belishev and Dimitrii Korikov (St. Petersburg Department of Steklov Mathematical Institute, Russia). *Recent results on Electric Impedance Tomography of 2-dim Riemannian manifolds.*

15:50–16:10: Coffee break

16:10–17:00: Alexander Minakov (Charles University, Czech Republic). *Asymptotic analysis for step-like problems for integrable equations* (**online talk**).

# Birman conference (June, 23 – June, 26)

## WEDNESDAY 23 June:

9:30–10:00: Registration

10:00–10:50: Andrey Piatnitski (The Arctic University of Norway, UiT, campus Narvik and IITP RA). *Homogenization of Steklov sieve.*

10:50–11:10: Coffee break

11:10–12:00: Tatiana Suslina (St. Petersburg State University). *Homogenization of the periodic Schrödinger-type equations.*

12:10–13:00: Sergei Nazarov (St. Petersburg State University, Russia). *Threshold resonances and virtual levels in the spectrum of periodic waveguides.*

13:00–15:00: Lunch

15:00–15:50: Valery Smyshlyaev (University College London, UK). *Uniform asymptotics for families of degenerating variational problems and applications to error estimates in homogenization.*

15:50–16:10: Coffee break

16:10–17:00: Nikita Senik (St. Petersburg State University, Russia). *On homogenization for locally periodic elliptic problems on a domain.*

## THURSDAY 24 June:

10:00–10:50: Andrei Shafarevich (Moscow State University). *Semiclassical eigenvalues for the Schrödinger operators on surfaces with conic points and with  $\delta$ -potentials.*

10:50–11:10: Coffee break

11:10–12:00: Andrey Shkalikov (Moscow State University). *Spectral properties of ordinary differential operators generated by a first order system.*

12:10–13:00: Denis Borisov (Institute of Mathematics, Ufa, Federal Research Center, RAS). *On bifurcations of internal thresholds in essential spectrum under small non-symmetric perturbations.*

13:00–15:00: Lunch

15:00–15:50: Alexey Karapetyants (Southern Federal University). *Mixed norm spaces of analytic functions as spaces of generalized fractional derivatives of functions in Hardy type spaces.*

15:50–16:10: Coffee break

16:10–17:00: Igor Sheipak (Lomonosov Moscow State University). *Spectral properties of a singular string equation: continuous spectrum and eigenvalues.*

17:30–20:00: Boat trip with a buffet

### FRIDAY 25 June:

10:00–10:50: Nikolai Filonov (PDMI RAS and St. Petersburg State University, Russia). *On the rate of decrease at infinity of solutions to a Schrödinger equation in a half-cylinder.*

10:50–11:10: Coffee break

11:10–12:00: Ilya Kachkovskiy (Michigan State University). *Ballistic transport for one-dimensional quasiperiodic Schrödinger operators.*

12:10–13:00: Elena Zhizhina (IITP RAS). *Ground state for nonlocal Schrödinger operator and spatially inhomogeneous contact models.*

13:00–15:00: Lunch

15:00–15:50: Alexander Nazarov (PDMI RAS and St. Petersburg State University). *The structure of the Dirichlet–Laplacian spectrum in the Fichera layers and crosses of arbitrary dimension.*

15:50–16:10: Coffee break

16:10–17:00: Andrew Comech (Texas A&M University, College Station, Texas and IITP, Moscow, Russia). *Virtual levels of operators in Banach spaces and application to Schrödinger operators.*

17:10–18:00: Vladimir Kapustin (St. Petersburg Department of the Steklov Mathematical Institute). *The set of zeros of the Riemann zeta function as the point spectrum of an operator.*

### SATURDAY 26 June:

9:40–10:05: Vladimir Bobkov (Institute of Mathematics UFRC RAS). *On multiplicity properties of higher eigenvalues of the  $p$ -Laplacian.*

10:10–10:35: Dmitry Polyakov (Southern Mathematical Institute of Vladikavkaz Scientific Center of RAS). *Spectral asymptotics for a fourth-order differential operator with multipoint boundary conditions.*

10:40–11:00: Coffee break

11:00–11:25: Anna Tsvetkova (Ishlinsky Institute for Problems in Mechanics of the Russian Academy of Sciences). *Asymptotics in the form of special functions of eigenfunctions of the operator  $\nabla D(\mathbf{x})\nabla$  defined in a two-dimensional domain and degenerating on its boundary.*

11:30–11:55: Anna Allilueva (Ishlinsky Institute for Problems in Mechanics RAS). *Asymptotic solutions for nonlinear equations of gas dynamics, describing smoothed discontinuities.*

12:00–13:30: Lunch

13:30: Trip to Kronstadt and Peterhof

# Summer school (June, 27 – June, 30)

## SUNDAY 27 June:

9:30–10:00: Registration

10:00–10:45 and 10:50–11:35: Dimitri Yafaev (Université de Rennes and St. Petersburg State University). *Spectral theory of Jacobi operators and asymptotic behavior of orthogonal polynomials.*

11:35–11:55: Coffee break

11:55–12:40 and 12:45–13:30: Vladimir Nazaikinskii (Ishlinsky Institute for Problems in Mechanics RAS, Russia). *Spectral flow and some applications.*

13:30–15:15: Lunch

15:15–16:00 and 16:05–16:50: Denis Borisov (Institute of Mathematics, Ufa Federal Research Center, RAS, Russia). *Eigenvalues and resonances emerging from thresholds in essential spectra.*

16:50–17:10: Coffee break

17:10–17:35: Alexey Kosarev (Moscow State University, Russia). *Asymptotics of fundamental solutions to  $2 \times 2$  first order system of ordinary differential equations.*

17:40–18:05: Tatiana Garmanova (Moscow State University, Russia). *Embedding constants in Sobolev spaces.*

## MONDAY 28 June:

10:00–10:45 and 10:50–11:35: Dimitri Yafaev (Université de Rennes and St. Petersburg State University). *Spectral theory of Jacobi operators and asymptotic behavior of orthogonal polynomials.*

11:35–11:55: Coffee break

11:55–12:40 and 12:45–13:30: Vladimir Nazaikinskii (Ishlinsky Institute for Problems in Mechanics RAS, Russia). *Spectral flow and some applications.*

13:30–15:15: Lunch

15:15–16:00 and 16:05–16:50: Denis Borisov (Institute of Mathematics, Ufa Federal Research Center, RAS, Russia). *Eigenvalues and resonances emerging from thresholds in essential spectra.*

16:50–17:10: Coffee break

17:10–17:35: Konstantin Zhuikov (RUDN University, Moscow, Russia). *Eta-invariant for parameter-dependent families with periodic coefficients.*

18:00–20:30: Boat trip with a buffet

**TUESDAY 29 June:**

10:00–10:45 and 10:50–11:35: Andrey Piatnitski (The Arctic University of Norway, UiT, campus Narvik and IITP RAS). *Stochastic homogenization of convolution type operators and convolution type energies.*

11:35–11:55: Coffee break

11:55–12:40 and 12:45–13:30: Alexander Fedotov (St. Petersburg State University). *A short introduction to the theory of ergodic operators.*

13:30–15:15: Lunch

15:15–16:00 and 16:05–16:50: Valery Smyshlyaev (University College London, UK). *High-frequency scattering by boundary inflection: a model for asymptotic transition from discrete to continuous.*

16:50–17:10: Coffee break

17:10–17:35: Olga Shchegortsova (Moscow Institute of Physics and Technology (National Research University)). *Gaussian beam solutions to the Cauchy problem for the Schrödinger equation with a delta potential.*

17:40–18:05: Vasily Sergeev (St. Petersburg State University). *On adiabatic evolution generated by a one-dimensional Schrödinger operator.*

**WEDNESDAY 30 June:**

10:00–10:45 and 10:50–11:35: Andrey Piatnitski (The Arctic University of Norway, UiT, campus Narvik and IITP RAS). *Stochastic homogenization of convolution type operators and convolution type energies.*

11:35–11:55: Coffee break

11:55–12:40 and 12:45–13:30: Alexander Fedotov (St. Petersburg State University). *A short introduction to the theory of ergodic operators.*

13:30–15:15: Lunch

15:15–16:00 and 16:05–16:50: Valery Smyshlyaev (University College London, UK). *High-frequency scattering by boundary inflection: a model for asymptotic transition from discrete to continuous.*

16:50–17:10: Coffee break