

Ekaterina Shchetka

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Professional experience

2017–. . . Research assistant, Chebyshev Laboratory, St. Petersburg State University.

Education

- 2017–. . . **Ph.D. student**, *St. Petersburg State University*, Department of Mathematics and Math. Physics.
- 2015–2017 **M.S. in Mathematical Physics**, *St. Petersburg State University*, Department of Mathematics and Math. Physics, graduated with honours, GPA 4.94.
- 2011–2015 **B.Sc. in Physics**, *St. Petersburg State University*, Department of Mathematics and Math. Physics, graduated with honours, GPA 4.97.

Master's thesis

2017 **Quasiclassical limit and analysis of difference equations**, advisor *Prof. Dr. A. Fedotov*.

Research interests

Spectral theory of almost periodic Schrödinger operators, ergodic Schrödinger operators, random Schrödinger operators, asymptotic analysis, analytic theory of difference equations on the complex plane.

Grants and scholarships

- 2018 Government Scholarship for Ph.D. students in priority areas of modernization and technological development of Russia;
- 2017 The winner of the competition for students and young researchers «Petropolitan Science (Re)Search»; Bocconi Institute of Data Science Award (Milan); Deich scholarship for the best master's thesis.
- 2016 Rokhlin Grant for young mathematicians of St. Petersburg; Government Scholarship for high academic achievements; St. Petersburg State University Alumni Association Scholarship.
- 2015 The 2nd place winner of the August Möbius Competition (Moscow).
- 2013 Government Special Scholarship in the field of mathematics and physics; Zarubina Scholarship for high academic achievements.

Publications

- 2018 • A. Fedotov, E. Shchetka. Monodromy matrices for Harper equation. Proceedings of the International Conference Days on Diffraction 2018, pp. 4, St. Petersburg: IEEE, *to appear*.
- A. Fedotov and E. Shchetka. Complex WKB method for a difference Schrödinger equation with the potential being a trigonometric polynomial. *St. Petersburg Math. J.* 29 (2018), 363-381.
- 2017 • A.A. Fedotov, E.V. Shchetka. The complex WKB method for difference equations in bounded domains. *Journal of Mathematical Sciences (USA)* 2017, 224:1 157-169.
- A. Fedotov, E. Shchetka. Berry phase for difference equations. Proceedings of the International Conference Days on Diffraction 2017, pp. 113-116, St. Petersburg: IEEE.

- A. Fedotov, E. Shchetka. Complex WKB method for the difference Schrödinger equation with the potential being a trigonometric polynomial. *Algebra and analysis*. Vol. 29, 2, pp. 188-214, 2017 (in russian).
- 2016 A. Fedotov, E. Shchetka. Complex WKB method for difference equations in unbounded domains. *Proceedings of the International Conference Days on Diffraction 2016*, pp. 140-143, St. Petersburg: IEEE.
- 2015 A.A. Fedotov, E.V. Shchetka. Complex WKB method for difference equations in bounded domains. *Zapiski Nauchn. Sem. POMI*, Vol. 438, pp. 236-254, 2015, (in russian).

Conference and seminar talks

- 2018 • **Conférence “Semi-classical and geometric asymptotics in mathematical physics”**, *Laboratoire CPT, Université de Toulon*, Toulon, France.
 - **Annual International Conference “Days on Diffraction”**, *St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences*.
- 2017 • **St. Petersburg Young Researcher Conference in Probability Theory and Mathematical Physics**, *St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences*.
 - **Chebyshev Lab Student Colloquium**, *Chebyshev Laboratory*, St. Petersburg.
 - **International Student Conference “Science and Progress”**, *St. Petersburg State University*.
 - **Annual International Conference “Days on Diffraction”**, *St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences*.
- 2016 • **A trilateral German-Russian-Ukrainian summer school “Spectral Theory, Differential Equations and Probability”**, *Johannes Gutenberg Universität*, Mainz, Germany.
 - **8th St.Petersburg Conference in Spectral Theory**, *Euler International Mathematical Institute*.
 - **Annual International Conference “Days on Diffraction”**, *St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences*.
 - **St. Petersburg Seminar on Wave Diffraction and Propagation**, *St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences*.
 - **Department of Mathematics and Math. Physics Seminar**, *St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences*.
- 2015 • **International Student Conference “Science and Progress”**, *St. Petersburg State University*.
 - **August Möbius Competition**, *Independent University of Moscow*.

Research projects

- 2017–... • Analysis and algebra in application and interaction (supervisor S. Smirnov), RSF 14-21-00035.
- Spectral and scattering theory methods in quantum physics and wave propagation theory (supervisor A. Fedotov), RFBR 17-01-00668;
- Asymptotic and spectral analysis of quantum systems with underlying periodicity (supervisor A. Fedotov), RFBR 17-51-150008-a;
- Developing of asymptotic and spectral investigation methods for periodic and almost periodic differential operators (supervisor T. Suslina), RSF 17-11-01069.

Schools

- 2018 • **Arbeitsgemeinschaft: Rigidity of Stationary Measure**, *MFO, Oberwolfach Research Institute for Mathematics*, Oberwolfach, Germany, (confirmed participant; to be held in October).
- **Summer School on Current Topics in Mathematical Physics**, *The Fields Institute for Research in Mathematical Sciences*, Toronto, Canada.

- 2017 • **Summer school: Discrete Models in Geometry and Mathematical Physics**, *Berlin Mathematical school: Technische Universität Berlin*, Berlin, Germany.
 - **Bocconi Summer School in Advanced Statistics and Probability: Statistical Causal Learning**, *Bocconi University*, Milan, Italy.
- 2016 • **A trilateral German-Russian-Ukrainian summer school “Spectral Theory, Differential Equations and Probability”**, *Johannes Gutenberg Universität*, Mainz, Germany.
 - **Summer School: Various Aspects of Mathematical Physics**, *Euler International Mathematical Institute*, St. Petersburg, Russia.

Languages

Russian (native), English (B2 certificate), French (basic), Chinese (basic).

References

- A. Fedotov Prof. Dr., advisor, St. Petersburg State University, s.fedotov@mail.ru
 T. Suslina Prof. Dr., the head of the Dep. of Mathematics and Math. Physics, St. Petersburg State University, suslina@list.ru
 N.Smorodina Prof. Dr., St. Petersburg Department of Steklov Institute of Mathematics of the Russian Academy of Sciences, smorodina@pdmi.ras.ru
 P. Zograf Prof. Dr., the head of the Chebyshev Laboratory, zograf@pdmi.ras.ru

Selected extra courses and seminars (semester length)

* = dep. of Math. Phys.

- 2017 Monodromization method in the theory of almost periodic operators (A. Fedotov, *)
 Gaussian processes (M. Lifshits, dep. of Stat. and Prob.)
 Stochastic integral (N. Smorodina, PDMI RAS, seminar)
 Mathematical statistics (Ya. Nikitin, dep. of Stat. and Prob.)
 Asymptotic methods in diffraction theory (M. Lyalinov, *)
 Functional models in the spectral theory of differential operators (R. Romanov, *)
- 2016 Spectral theory of periodic Schrödinger operators (A. Fedotov, *)
 Spectral theory of partial differential operators (R. Romanov, *)
 Mathematical scattering theory (N. Filonov, Chev. Lab.)
 Random processes (N. Smorodina, PDMI RAS, seminar)
 Markov processes (N. Smorodina, *)
 Analytical methods in inverse problems (E. Korotyaev, *)
 Integrable systems and inverse spectral method: Riemann-Hilbert problem (V. Sukhanov, *)
 Dynamical inverse problems (M. Belishev, *)
- 2015 Spectral theory of ergodic Schrödinger operators (A. Fedotov, *)
 Spectral theory of ordinary differential operators (V. Sukhanov, *)
 Isomonodromic deformations and Painlevé equations (A. Kapaev, Chev. Lab.)
 Pseudodifferential operators and boundary problems (B. Plamenevski, *)
 Morse theory (A. Ivanov, *)
 Many-body scattering theory (S. Levin, *)
- 2014 Lie groups and Lie algebras (A. Budilin, *)
 Sobolev spaces (T. Suslina, *)
 Symplectic geometry (A. Ivanov, *)
 Dynamical systems (S. Pilyugin, dep. of Diff. Eq.)